

Final

SOUTH SPAR BOOSTER PUMP STATION

Critical Areas Report and Mitigation Plan

Prepared for
City of Issaquah and WSDOT

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1 INTRODUCTION

The City of Issaquah (City) is proposing to construct a drinking water pump booster station (BPS) and approximately 8,000 linear feet of water-related water transmission lines as part of the South SPAR Booster Pump Station Project (Project). This project is located along the Issaquah-Preston Bike Trail, in the vicinity of Swedish Hospital Issaquah Campus (Figures 1 and 2). At the request of the City, Environmental Science Associates (ESA) delineated and flagged wetland boundaries and flagged the ordinary high water mark (OHWM) or centerline of streams in the project area (Figure 3).

ESA's original scope of work was limited to identifying and delineating one mapped stream; however, during May 2017 the field investigation, ESA biologists Scott Olmsted and Pete Lawson identified three (unmapped) wetlands and three streams in the study area. These six aquatic features were not identified by existing information sources. Other types of critical areas regulated by the City, such as aquifer recharge areas and areas subject to erosion, flooding, and landslides are not addressed in this report.

This report is organized to meet the requirements of the critical areas ordinance (Chapter 18.10 – Environmental Protection) of the Issaquah Municipal Code (IMC) and support the NEPA documentation process for the Washington State Department of Transportation (WSDOT).

2 PROPOSED PROJECT

2.1 Location

The project is located north of I-90 and west of Highlands Drive NE between SE 74th Street and NE Discovery Drive, within the City of Issaquah (Figures 1 and 2). The booster pump station will be located on Parcel 2724069126 and the pipeline will traverse Parcels 5279100850 and 2724069008, all owned by the City. In addition, the pipeline will be located within WSDOT right-of-way (ROW) (Figures 1 and 2).

2.2 Purpose and Description

The project proposes to provide redundant facilities to move water from either the Valley 297 Zone or the Cascade Water Alliance regional supply line up to the Issaquah Highlands Central Park 742 Zone, as well as other zones fed from the Highlands Central Park 742 Zone. Currently, there is only one water source to the Issaquah Highlands.

The booster pump station would occupy approximately 800 square feet and be constructed of concrete masonry to house three booster pumps and related piping, valves, and accessories. The booster pump station would supply water to three 12-inch PW pipes that would send water to 742 Zone, 297 Zone, and serve as regional supply. New pipeline would tie into existing pipe at the entrance to the Issaquah Village RV Park, continue southeast along SE 74th Street and Issaquah-Preston Trail, connect to the pump station, and continue to the east and north along the trail and Highlands Drive NE to the intersection with NE Discovery Drive where it would tie back into existing pipe. In addition, installation of fiber optics and electrical conduits are planned adjacent to the water mains. Paved parking areas would surround the booster pump station and an existing access road would be improved from dirt to a paved surface approximately 15-foot-wide surface in order to facilitate vehicle access (Figures 1 and 2).

In the future, a separate project would propose to construct a water reservoir in proximity to the pump station that would provide additional water storage needed to meet anticipated future growth in the central Issaquah area.

3 METHODS

Methods defined in Regional Supplements to the U.S. Army Corps of Engineers 1987 Wetlands Delineation Manual (Corps, 2010) were used to determine the presence and extent of wetlands in the study area. The Washington State Department of Ecology repealed WAC 173-22-080 (the state wetland delineation manual) and replaced it with a revision of WAC 173-22-035 that states that delineations should be done according to the currently approved federal manual and supplements (effective March 14, 2011). Methods are described in more detail in Appendix A.

The methodology outlined in the manuals is based upon three essential characteristics of wetlands: (1) hydrophytic vegetation; (2) hydric soils; and (3) wetland hydrology. Field indicators of these three characteristics must all be present in order to determine that an area is a wetland (unless problem areas or atypical situations are encountered).

Formal data plots were established in the field where information regarding each of the three wetland parameters (vegetation, soils, and hydrology) was recorded. Data forms are provided in Appendix B. This information was used to distinguish wetlands from non-wetlands. Where wetlands were determined to be present on the subject property, the wetland boundaries were delineated.

4 EXISTING INFORMATION

Washington Department of Fish and Wildlife's (WDFW's) Salmonscape database does not map any streams within the project area (WDFW, 2017a). WDFW's Priority Habitats and Species (PHS) database, King County, and the City do not map any wetlands or streams within the project area (WDFW, 2017b; King County, 2017; City of Issaquah, 2017). The National Wetlands Inventory (NWI) map does show any wetlands within the project area (USFWS, 2017). However, the NWI does show a stream east of the pump station that flows from the undeveloped area, south underneath the trail and I-90, discharging to East Fork Issaquah Creek.

WDFW's Priority Habitats and Species (PHS) database does not indicate the documented presence of any state priority species or habitats in the project area besides Townsend's Big-eared bat (WDFW, 2017b). Immediately south of the project area, numerous listed species are mapped within East Fork Issaquah Creek.

Although soils are not a critical area, they can provide additional information related to critical areas (e.g., identifying hydric soils may indicate potential wetlands). Two soil types are mapped within the project area; Everett very gravelly sandy loam, 0 to 8 percent slopes comprise the western portion of the most of the study along the Issaquah-Preston Trail, while the majority of the project area is mapped as Alderwood and Kitsap soils, very steep (NRCS, 2016). Both soil types are no classified as hydric (USDA, 2015).

5 RESULTS OF THE FIELD INVESTIGATION

5.1 Local Setting

The project is located on a large hillslope between the Issaquah Highlands and Interstate 90 (I-90). The booster pump station would be located on the site of a former gravel pit used for construction of I-90. This area was cleared and is largely dirt and quarry spall, with some recolonization by alder and cottonwood trees, a few native shrubs, and invasive vegetation well suited to disturbed areas (e.g., Himalayan blackberry and Scotch broom). During our site visit, a homeless encampment was observed near one of the onsite streams, southeast of the proposed booster pump station.

Coniferous and deciduous forest immediately surround the pump station site, with residential and industrial development, Swedish Hospital, I-90 and Highlands Drive NE surrounding the undeveloped area (Figure 1). Vegetation near the booster pump station was dominated by a mixture of upland, riparian, and wetland plants, including a canopy of Douglas-fir (*Pseudotsuga menziesii*), big-leaf maple (*Acer macrophyllum*), black cottonwood (*Populus trichocarpa*), and red alder (*Alnus rubra*). Typical shrubs observed included salmonberry (*Rubus spectabilis*), red-osier dogwood (*Cornus sericea*), and beaked hazelnut (*Corylus cornuta*). Species such as lady fern (*Athyrium filix-femina*), sword fern (*Polystichum munitum*), field horsetail (*Equisetum arvense*), and common rush (*Juncus effuses*) were frequently observed herbaceous species. Scotch broom (*Cytisus scoparius*), Himalayan blackberry (*Rubus armeniacus*), English ivy (*Hedera helix*), and English holly (*Ilex aquifolium*) were common invasive species.

5.2 Wetland Descriptions

ESA identified and delineated three wetlands in the project area, all within the vicinity of the pump station. Based on the project plans and a field reconnaissance, no disturbance to any critical areas would result from the installation of the pipeline, the majority of the pipeline will be installed under existing paved trails (Figure 2). See photographs and Figure 3, for an overview of wetlands located within the project area.

5.2.1 Wetland A

Overview: Wetland G is a palustrine emergent, slope wetland located southwest of the proposed booster pump station (Table 1). DP 2-1 characterizes the wetland, while DP 1-2 is representative of the adjacent uplands.

Hydrology: Wetland hydrology indicators observed in Wetland A were surface water (A1) and saturation to the surface (A3). This is a headwater wetland for Stream 1. The wetland is supported by a high groundwater table that expresses at the face of the slope. A one-inch diameter galvanized steel pipe was observed discharging a trickle of water on the wetland's northern boundary.

Soils: Soils observed at the wetland data plots were primarily loam. From the soil surface to 6 inches below the soil surface, soils were very dark grayish brown (10YR 3/2). From 6 inches to 16 inches below the soil surface, soils were grayish brown (10YR 5/2) with 5 percent dark yellowish brown (10YR 4/6) concentrations (i.e., redoximorphic features) in the matrix. This meets the criteria for depleted matrix (F3).

Vegetation: Wetland A contains a palustrine emergent plant community. The wetland is dominated by watercress (*Nasturtium* sp.), with scattered English ivy and newly sprouted salmonberry.

Wetland Functions: Wetland A received an overall score of 15 points, which corresponds to a Category IV rating. The presence of multiple hydroperiods, several special habitat features, and adjacent priority habitats, along with a general lack of water quality and hydrologic functions support a moderate functional rating for the wetland. The buffer of Wetland A consists largely of forested fringe to the north and east, with disturbed areas to the west and south (i.e., site of the former WSDOT gravel pit).

5.2.2 Wetland B

Overview: Wetland B is greater than 0.06-acre in size (only the western wetland boundary was delineated for the project). The slope wetland is palustrine scrub-shrub and emergent, and located east of the proposed booster pump station site (Table 1). DP 3-1 characterizes the wetland, while DP 3-2 is representative of the adjacent uplands.

Hydrology: Wetland hydrology indicators observed in Wetland B were a water table observed at 10 inches below the soil surface (A2) and saturation to the surface (A3). The wetland is supported by a high groundwater table and precipitation. Portions of the central and southern wetland are seasonally inundated. Wetland B is a headwater wetland for Stream 2.

Soils: Soils observed at the wetland data plots were primarily sandy loam. From the soil surface to 3 inches below the soil surface, soils were very dark brown (10YR 2/2). From 3 inches to 9 inches below the soil surface, soils were dark gray (2.5Y 4/1) with 5 percent light olive brown (2.5Y 5/6) concentrations in the matrix. From 9 inches to 16 inches below the soil surface, soils were olive (5Y 4/3) with 3 percent dark yellowish brown (10YR 3/6) concentrations in the matrix. This meets the criteria for depleted matrix (F3).

Vegetation: Wetland B contains both palustrine scrub-shrub and palustrine emergent plant communities. The wetland is dominated by salmonberry, with red alder and ladyfern commonly observed.

Wetland Functions: The wetland received an overall score of 16 points, which corresponds to a Category III rating. The presence of multiple hydroperiods, several special habitat features, and adjacent priority habitats, along with a general lack of water quality and hydrologic functions support a moderate functional rating for the wetland. The buffer of Wetland B consists largely of forested fringe to the north and east, with disturbed areas to the west and south (i.e., site of the former WSDOT gravel pit).

5.2.3 Wetland C

Overview: Wetland C is a palustrine forested, slope wetland located to the southeast of the proposed booster pump station (Table 1). DP 4A-2 characterizes the wetland, while DP 4A-1 is representative of the adjacent uplands. Wetland C is 0.17 acre in size.

Hydrology: Wetland hydrology indicators observed in Wetland C were a water table observed at the soil surface (A2) and saturation to the surface (A3). The wetland also features a seasonally inundated portion along its eastern and southern boundaries. Along a short stretch the wetland's southern boundary, sandbags were placed to impede the flow of water down-gradient, resulting in inundation. Stream 2 discharges to the northeastern portion of the wetland and Stream 3 discharges to the northwestern boundary. Stream 2 continues through the wetland and discharges from the wetland's southeastern boundary. The wetland is also supported by a high groundwater table.

Soils: Soils observed at the wetland data plots were primarily silt loam. From the soil surface to 3 inches below the soil surface, soils were very dark brown (10YR 2/2). From 3 inches to 12 inches below the soil surface, soils were gray (7.5YR 5/1) with 10 percent yellowish brown (10YR 5/8) concentrations in the matrix. At 12 inches below the soil surface was a restrictive layer composed of rock. This meets the criteria for depleted matrix (F3).

Vegetation: Wetland C primarily contained red alder with scattered willow (*Salix* sp.), black cottonwood (*Populus trichocarpa*), and common rush covering portions of the wetland.

Wetland Functions: The wetland received an overall score of 16 points, which corresponds to a Category III rating. Similar to Wetland C, the presence of multiple hydroperiods, several special habitat features, and adjacent priority habitats, along with a general lack of water quality and hydrologic functions support a moderate functional rating for the wetland. The buffer of Wetland C consists largely of a forested fringe with dirt access roads to the south, east and west.

5.3 Wetland Functions

Wetlands in the project area generally provide low to moderate water quality and hydrologic functions, and relatively low habitat functions (Table 1). Water quality and hydrologic function scores for project area wetlands are primarily linked to location and vegetation structure – project area wetlands are immediately surrounded by undeveloped lands and contain sparse to moderate vegetation cover, giving them less opportunity and capacity to provide water quality and hydrologic functions. However, they are located within an urbanized watershed that experiences water quality and flooding problems, so any water quality or water storage functions that the wetlands do provide is valuable. Low habitat scores for project area wetlands are also a function of location and vegetation structure. These wetlands are located within a watershed that has experienced significant development resulting in limited and fractured open space, providing minimal habitat connectivity. Plant species diversity and structure are fairly limited; however, in the immediate vicinity of the wetlands, other priority habitats are present (e.g., other streams).

Additionally, Wetlands B and C contain several special habitat features (e.g., downed logs, snags), which slightly improve habitat functions for these wetlands.

TABLE 1.
WETLAND SUMMARY

Wetland Identifier	Wetland Area (sf)	Cowardin Classification	HGM	Wetland Rating (2014)	Habitat Score
WL A	2,267	PEM	Slope	IV	5
WL B	>2,500*	PSS/PEM	Slope	III	6
WL C	7,313	PFO	Slope	III	6

*Only the wetland boundary closest to the proposed development was flagged; therefore, the wetland area is estimated.

5.4 Stream Descriptions

ESA identified and flagged three streams within the project area. The centerline of Stream 1 was flagged in the field and the measured OHWM width was used to estimate the OHWM. The OHWM of the stream bank closest to the project area was flagged along Streams 2 and 3. See Figure 3 and Table 2 for an overview of streams located within the project area.

TABLE 2.
STREAM SUMMARY

Stream Identifier	Location	DNR Classification	Local Jurisdiction Classification
Stream 1	Southwest of Pump Station	Ns	Class 3
Stream 2	Southeast of Pump Station (between WL B and C)	Ns	Class 3
	Southeast of Pump Station (downstream of WL C)	Np	Class 2
Stream 3	Southeast of Pump Station	Ns	Class 3

5.4.1 Stream 1

Stream 1 is a Type Ns stream (a Class 3 stream according to City code) that originates at Wetland A, flows to the northwest across the hillslope for several hundred feet, then makes a 90 degree turn (man-made change in flow direction) to the southwest down a steep slope (greater than 40 percent). Prior to the change in direction of flow, the wetted width of the stream is approximately 2 feet wide with shallow flow (two to four inches deep) during the site visit.

Stream bed and banks are primarily composed of fine material (e.g., loam soil texture). After the stream changes direction and flows downhill, the wetted width and depth of flow are reduced moving downslope to a location halfway down the slope where flow goes subsurface. Stream bed and banks in this portion of the stream contain coarser material (gravels upslope and quarry spall downslope). The slope in this stream segment is greater than 50 percent.

The channel discharges to a quarry spill-lined depression with a perched culvert under the Issaquah-Preston Trail. The culvert likely discharges eventually to East Fork Issaquah Creek located on the south side of I-90.

5.4.2 Stream 2

Stream 2 originates at Wetland B and flows to the southeast. The upper reaches of Stream 2 (between Wetlands B and C) is a Type Ns stream (a Class 3 stream according to City code), while the reach of Stream 2 downstream of Wetland C is a Type Np stream (a Class 2 stream according to City code). A short, upstream segment of the stream (approximately 200 linear feet) was not observed because it flows through a homeless encampment, which was not accessed at the time of the field survey. However, the upper portion of the stream had an approximately 8-foot wetted width and about 6 inches of flow that traveled down a gentle slope (less than 5 percent). Downstream of the encampment, the slope increased to approximately 5 percent and the stream width narrowed to about two feet as the stream discharged to the eastern end of Wetland C.

Once past Wetland C, the stream channel measures approximately 4-6 feet wide and several feet deep until the stream discharges into a series of two man-made detention pods located upslope from the Issaquah-Preston Trail. The ponds are each roughly 1,000 square feet in size and connected by a culvert. The down gradient pond discharges to an approximately 4-foot stack pipe that likely travels under I-90, eventually discharging to East Fork Issaquah Creek.

5.4.3 Stream 3

Stream 3 is a Type Ns stream (a Class 3 stream according to City code) that originates from a hillside seep west of the homeless encampment. The stream flows alongside the existing dirt access road that travels between the trail and the proposed development site. Stream 3 had an approximately 3-foot wetted width and shallow flow (one-inch deep) during the site visit. Stream substrate was primarily gravel with small rounded rocks. The stream flows down an approximately 20 percent slope and discharges to the northwest corner of Wetland C.

6 REGULATORY REQUIREMENTS

6.1 Wetland and Stream Buffer Requirements

Wetlands in the project area are located within City of Issaquah and are regulated by Issaquah Municipal Code [IMC] 18.10.620. According to local code, all wetlands must be classified using the Washington State Wetland Rating System for Western Washington—2014 Update (Hruby, 2014). Section 18.10.640 of the IMC states that required buffer widths for wetlands depend on the wetland rating and score for habitat function. A wetland rating form for each wetland is included in Appendix C.

Wetland buffer reduction may be allowable with buffer vegetation enhancement, pursuant to IMC 18.10.650(D)(3). Buffers may not be reduced by more than 25 percent without a variance. The standard and minimum buffer required for all wetlands located within the project area is shown in the Table 3.

**TABLE 3.
WETLAND BUFFERS**

Wetland Identifier	Standard Buffer Width (feet)	Minimum Allowable Buffer Width (feet) without Variance
WL A	25*	NA
WL B	75	56.25
WL C	75	56.25

*

Streams are regulated by City of Issaquah under IMC 18.10.770. These regulations provide standards for development including stream ratings and standard buffer widths. Stream buffers are regulated under IMC 18.10.785. Buffer widths for streams largely depend on the presence of salmonids and the duration of flow.

Stream buffer reduction to the minimum width shown in Table 4 may be allowable with buffer vegetation enhancement, pursuant to IMC 18.10.790(D)(4). As with wetland buffers, stream buffers may not be reduced by more than 25 percent without a variance. Stream types and the standard and minimum buffer requirements are summarized in Table 4.

**TABLE 4.
STREAM BUFFERS**

Stream Identifier - Location	Standard Buffer Width (feet)	Minimum Allowable Buffer Width (feet) without Variance
Stream 1	50	37.5
Stream 2 - between WL B and C	75	56.25
Stream 2 – Downstream of WL C	50	37.5
Stream 3	50	37.5

The proposed road alignment, pump station building location, and associated development, has been sited based on the location of the existing road and other areas already degraded. The proposed impact area is located within the minimum allowable buffers of onsite wetlands and streams. Therefore, a variance is required.

6.2 Significant and Protected Trees

6.2.1 City of Issaquah Tree Protection Requirements

City of Issaquah Critical Areas Ordinance (IMC 18.12) requires protection of significant and protected trees and provides minimum tree density requirements for developable site areas. Section 18.12.030 of the IMC defines a significant tree as a tree at least six inches or greater at diameter breast height (dbh), or an alder or cottonwood tree eight inches or greater at dbh. A protected tree is defined as any tree in a greenbelt, Native Growth Protection Easement (NGPE), environmentally critical area, common area, approved landscape plan, right-of-way, City-owned property, or protected by any other measure.

Based on a site size of between 3 and 15 acres in size, the project location abutting I-90, and the project purpose of installation of a major utility, the project will require Level 3 review by City of Issaquah. Clearing of significant trees requires approval and the site must meet the minimum tree density standards. City code (IMC 18.12.1370) requires if any tree removal occurs within Facilities zoned areas, the post-project site meet minimum tree density requirements of 4 significant trees per 5,000 square feet, with the density calculation based on developable site area of the lot(s).

6.2.2 WSDOT Tree Protection Requirements

As part of the City's acquisition of the parcels, WSDOT is requiring the City adhere to elements of the WSDOT Roadside Policies for site restoration, as listed in the WSDOT (2015) *Roadside Policy Manual*. Specifically, WSDOT requires tree replacement for those cleared to construct the project. City and ESA staff met with WSDOT Landscape Architect Deborah Peters at the project site on April 20, 2018. At the site visit, Ms. Peters requested the City 1) survey all trees that have a dbh (diameter breast height) of 6-inches or greater and would be potentially impacted (cleared) during project construction, 2) mitigate for all coniferous trees over six inches in diameter at tree replacement ratios outlined in WSDOT (2015). Ms. Peters gave direction that impacts to deciduous trees would not require replacement at prescribed ratios, as natural recruitment of alder and cottonwood was prevalent over the entire project area, and because no mature stands of deciduous forest are present onsite.

As elucidated in the WSDOT (2015) *Roadside Policy Manual*, WSDOT requires tree replacement of moderate-size coniferous and other late successional tree species (>6-inches). Replacement ratios are given as one 1-gallon replacement tree for each 1-inch of trunk diameter, or, if larger container sizes (2-gallon container plants) are used, the plant quantity will be adjusted to a ratio of 0.5 2-gallon replacement trees for each 1-inch of trunk diameter.

7 PROJECT IMPACTS AND MITIGATION

7.1 Avoidance and Minimization

City of Issaquah requires project applicants to demonstrate that all reasonable efforts have been made to avoid and minimize impacts to critical areas. When an alteration to a critical area is proposed, the applicant must follow the mitigation sequencing process to first avoid and minimize impacts before proposing compensatory mitigation (IMC 18.10.490). The Project was designed to avoid and minimize impacts to wetlands, streams, and their buffers in accordance with the following preferred sequence of mitigation:

1. Avoid impacts altogether by not taking a certain action or parts of an action;
2. Minimize impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;
3. Rectify impacts by repairing, rehabilitating or restoring the affected environment;
4. Compensate for the impact by replacing, restoring, creating, enhancing or providing substitute resources or environments;
5. Monitor the impact and the compensation projects and taking appropriate corrective measures.

The Project has been designed to avoid direct impacts to wetlands and streams and to reduce buffer impacts to the extent practicable given the topography constraints and presence of an existing unimproved road. With the exception of the pump station and pump station access road, all impacts to critical areas on the remainder of the water line have been avoided. The buildable land on the site is highly constrained due to the steep slope topography north of the pump station and pump station access road and the wetlands and streams to the south, as well as the forested nature of the site and presence of multiple significant trees. The City redesigned and shifted the layout of both the access road and pump station several times to minimize impacts to all of these critical areas and their buffers. Project design which largely follow the existing road where vegetation is cleared and buffers are already degraded will further reduce critical area impacts.

7.2 Unavoidable Project Impacts

7.2.1 Wetland Buffers and Stream Buffers

Several Project redesigns have occurred to reduce impacts to critical areas. Based on the proximity of Stream 3 to the existing dirt road, the preliminary design would have resulted in temporary stream impacts. Project plans were adjusted to avoid temporary and permanent impacts to Stream 3. The Project was also redesigned to avoid direct impacts to Wetland B, and to minimize Wetland B buffer impacts by shifting the road and pump station building west of the previously planned location, away from Wetland B. Even with these changes, Project construction will result in approximately 9,593 square feet of temporary impacts and 23,659 square feet of permanent impacts to wetland and stream buffers (Figures 4 and 5).

No direct impacts to any project area wetlands (Wetland A, B, and C) or streams (Stream 1, 2, and 3) will result from the project; however, construction impacts encroach into the regulated buffers of Wetland B, Wetland C, Stream 2, and Stream 3. Buffer impacts primarily include grading and paving of the existing gravel road. Most of this area is currently cleared but the road will be widened slightly to facilitate fire department access, as required by City road design standards.

7.2.2 Significant and Protected Trees

The Project impact footprint was moved slightly after initial design, to minimize clearing of larger trees in the vicinity of the pump station. The City conducted a survey of potentially impacted trees. The survey was overlaid with the permanent and temporary project impact areas to assess the extent of tree clearing (Figure 6). Figure 7 summarize the impacts to coniferous and deciduous trees. The trees to be cleared range in size from 6-inch dbh to 38-inch dbh, with the vast majority of trees less than 20-inch dbh. All coniferous trees (>6-inches dbh) to be cleared are Douglas fir (*Pseudotsuga menziesii*), of which thirty-three trees will be removed with total diameter impacts of 410-inches (Figures 6 and 7). Twenty deciduous trees will be removed (>6-inches dbh), consisting of red alder (*Alnus rubra*), bigleaf maple (*Acer macrophyllum*), and black cottonwood (*Populus trichocarpa*) (Figures 6 and 7).

7.3 Mitigation Goals, Objectives, and Performance Standards

7.3.1 Regulatory Setting

Wetland and Stream Buffer Mitigation

The overall goal of the wetland and stream buffer mitigation is to replace the habitats and functions lost or altered as a result of the Project. Proposed mitigation activities are designed to compensate for these functional impacts. Wetland and stream buffers reduce sediment and nutrients from entering the wetlands and streams, improve temperature moderation, increase plant species diversity, provide wildlife habitat, and deter human disturbance of these resources. Restoring a more native vegetation community to the aquatic area buffers would improve all of these functional attributes of the buffers and provide additional protection to the adjacent wetland and stream systems.

Areas with temporary wetland and stream buffer impacts will be revegetated with native vegetation after construction activities are completed, in accordance with IMC 18.10.610(D). This revegetation will consist of ensuring the temporarily disturbed area is restored to an original grade and is planted with native grasses and shrubs (Figures 8 through 10).

Mitigation for permanent wetland and stream buffer impacts would occur in the form of buffer enhancement. The proposed enhancement area was selected for its degraded condition and high potential for buffer function improvement, and its location relative to the wetland and stream system and proposed development. This area is identified on Figures 8 and 9. Enhancement measures would include the removal of all invasive, non-native vegetation (primarily Himalayan

blackberry and Scotch broom) and quarry spall, and planting of appropriate native shrub and tree species (Figures 8 through 10).

Issaquah Municipal Code 18.10.650 – *Exceptions to wetland buffer width requirements*, and IMC 18.10.790 - *Exceptions to stream buffer width requirements*, do not require wetland buffer impacts to be mitigated at a specific mitigation ratio; however, buffer mitigation for Wetland B, Wetland C, Stream 2, and Stream 3 would be implemented at a 1:1 mitigation ratio (Wetland A is less than 2,500 square feet and therefore, no buffer is required per IMC 18.10.720(B)(3) although a buffer is applied to Stream 1; additionally, no construction is proposed within approximately 100 feet of Wetland A).

The project proposes 23,982 square feet of wetland/stream buffer enhancement within the existing buffers of Wetlands B and C and Streams 2 and 3. The buffer enhancement will serve to mitigate the 23,659 square feet of permanent buffer impacts. The proposed buffer mitigation would provide a mitigation ratio of greater than 1:1, exceeding IMC requirements.

IMC 18.10.795 – *Mitigation for streams*, does not prescribe quantitative stream buffer mitigation requirements, but does require “...no net loss of stream functions on a development proposal site and no impact on stream functions above or below the site due to approved alterations.” Given the degraded condition of the existing stream buffers within the proposed development area, and the proposed enhancement activities, no net loss of stream functions is anticipated.

Tree Protection Mitigation

City of Issaquah Critical Areas Ordinance (IMC 18.12) requires protection of significant and protected trees and provides minimum tree density requirements for developable site areas. Section 18.12.030 of the IMC defines a significant tree as a tree at least six inches or greater at diameter breast height (dbh), or an alder or cottonwood tree eight inches or greater at dbh. A protected tree is defined as any tree in a greenbelt, Native Growth Protection Easement (NGPE), environmentally critical area, common area, approved landscape plan, right-of-way, City-owned property, or protected by any other measure.

Based on the site size, the project location abutting I-90, and the project purpose of installation of a major utility, the project will require Level 3 review by City of Issaquah. Clearing of significant trees requires approval and the site must meet the minimum tree density standards. City code (IMC 18.12.1370) requires that if any tree removal occurs within Facilities zoned areas (which includes the project area), the post-project site meet minimum tree density requirements of 4 significant trees per 5,000 square feet, with the density calculation based on developable site area of the lot(s). The minimum tree density is based on existing significant trees, replacement trees, or a combination of both and significant trees also include the equivalent size in caliper inches at dbh.

In addition to meeting the conditions of ICC, the Project requires City purchase of WSDOT-owned property, which in turn requires adherence to WSDOT environmental policy, including tree retention and replacement policy. As elucidated in the Roadside Policy Manual (WSDOT,

2015), WSDOT requires tree replacement of moderate-size coniferous and other late successional tree species (>6-inches).

Replacement ratios are given as one 1-gallon replacement tree for each 1-inch of trunk diameter, or, if larger container sizes (2-gallon container plants) are used, the plant quantity will be adjusted to a ratio of 0.5 2-gallon replacement trees for each 1-inch of trunk diameter. Tree removal mitigation will occur on-site and will be preceded by the removal of existing blackberry patches. Tree plantings will occur in both unvegetated areas as well as within existing forested areas.

In order to meet City and WSDOT requirements for tree replacement, the project will plant a total of 410 replacement trees within the project area, over an approximate area of approximately 42,000 square feet (Figures 12 and 13). This includes the planting of 310 Douglas fir trees within the project western portion of the project area. This action will offset impacts from removal of 33 coniferous trees, equating to a tree replacement ratio of greater than 9:1. The 310 Douglas fir trees will be a combination of two tree sizes, 1-gallon containers and 2-gallon containers. The total mitigation credit of 420-inches dbh combination exceeds WSDOT requirements to offset total project impacts to conifers (410-inches dbh) (Table 3). Douglas fir was selected as an appropriate species for mitigation because, 1) all surveyed coniferous trees that will be cleared for the project are Douglas fir, and 2) the forest immediately adjacent to the project site is dominated by this coniferous species.

In addition to offsetting impacts to coniferous tree species, the tree planting plan also includes planting of deciduous species. Approximately 100 containers of bigleaf maple (*Acer macrophyllum*) will be installed on the project site, with an equal mix of 1-gallon and 2-gallon containers. The planting equals a tree replacement ratio of 5:1. Bigleaf maple was selected as an appropriate species for mitigation as it is shade tolerant, as planting of this species in existing conifer forest will eventually provide an ecologically beneficial understory and help promote growth of an understory

TABLE 5.
PROPOSED MITIGATION FOR IMPACTS TO SIGNIFICANT TREES (> 6-INCHES DBH) FOR THE SPAR RESERVOIR AND PUMP STATION

Species	Container Size	Number of Trees	Number of DBH Inches that Tree Planting Offsets
Douglas fir	2-gallon	110	220
Douglas fir	1-gallon	200	200
Totals		300	420

Figures 12 and 13 show the location of proposed tree planting. Immediately north of the new pump station and around the perimeter of the future water tower site, trees will be planted in those areas where grasses and nonnative blackberry currently predominate. Removal of invasive species will occur in these areas prior to planting. In addition, inplanting of fir and bigleaf maple will occur in the vicinity of the pump station, primarily south of the pump station. This will increase canopy density in the long-term as well as increase visual screening of the site from I-90

and the regional trail system to the south. Figure 14 lists the planting schedule, notes on planting and removal of invasive species, and typical planting layouts, and container planting details.

The infill planting of 410 trees to offset the clearing of 53 significant trees will meet all requirements of both City code and WSDOT policy, resulting in a high tree density in both developable and non-developable areas within the project footprint. With the exception of the pump station location, tree planting will occur in all areas west of the access road, resulting in a healthy, multi-aged and multi-species forest community. Note that the tree mitigation is in addition to the planting of 159 one-gallon coniferous and 104 1-gallon deciduous trees within the Buffer Mitigation Site.

7.3.2 Mitigation Goals

Specific mitigation goals for the wetland and stream buffer mitigation include the following:

- Enhance approximately 23,982 square feet of existing wetland and stream buffer through the removal of invasive species and quarry spall, and the planting of native trees and shrubs.
- Restore to pre-construction conditions (contours and conditions) all temporarily disturbed wetland buffer and stream buffer (5,569 square feet) through planting of native shrubs and grasses. In addition, areas of bare earth (approximately 15,348 square feet) within the permanent impact area will be stabilized through seeding of a native grass mix, which was specifically selected both for its shade tolerance and drought tolerance properties.

Specific mitigation goals for the tree replacement mitigation include the following:

- Infill plant 310 coniferous and 100 deciduous trees within an area of approximately 42,000 square feet, including invasive species (blackberry) removal over approximately 7,700 square feet of the planting area.

7.3.3 Objectives and Performance Standards

Objective 1: Establish native herbaceous, shrub, and tree cover in the buffer mitigation areas (including areas temporarily impacted).

Performance Standard 1a: Year 1—100 percent survival of installed native woody species within 1 year of mitigation installation. If all installed shrubs and trees that die in the first year are replaced, the performance measure will be met.

Performance Standard 1b: Year 2—At least 40 percent coverage of native species in the buffer mitigation areas (installed and desirable volunteer).

Performance Standard 1c: Year 3—At least 60 percent coverage by woody native plant species in the buffer mitigation areas (installed and desirable volunteer).

Performance Standard 1d: Year 4—At least 70 percent coverage by woody native plant species in the buffer mitigation areas (installed and desirable volunteer).

Performance Standard 1e: Year 5—At least 80 percent coverage by native woody plant species in the buffer mitigation areas (installed and desirable volunteer).

Performance Standard 1f: Year 5— A minimum of two native coniferous tree species and five native woody shrub species will be established within buffer mitigation areas.

Objective 2: Remove non-native, invasive vegetation in the buffer mitigation areas.

Performance Standard 2a—Himalayan blackberry, Scotch broom, and other noxious weeds will not exceed 10 percent coverage in all planting areas throughout the 5-year monitoring period.

Objective 3: Establish native coniferous and deciduous trees to meet tree density requirements and to provide future visual screening of current and future project elements (pump station and water tower).

Performance Standard 3A: Year 1—100 percent survival of installed native woody species within 1 year of mitigation installation. If all installed trees that die in the first year are replaced, the performance measure will be met.

Performance Standard 3B: Year 2—90 percent survival of installed native woody species within 2 years of mitigation installation.

Performance Standard 3C: Year 3—80 percent survival of installed native woody species within 1 year of mitigation installation.

7.4 Monitoring Plan

Issaquah Municipal Code 18.10.650 – *Exceptions to wetland buffer width requirements* requires that any wetland buffer enhancement plan required to compensate for a reduction of the standard buffer width include a monitoring and maintenance plan for five years, consistent with IMC 18.10.760(F). In accordance with IMC 18.10.760(F), five years of annual monitoring is proposed.

The main objective of mitigation monitoring is to document the level of success in meeting the Project’s performance standards. Construction monitoring will ensure that clearing limits are maintained as described in the construction documents and plans, and that sediment control devices such as silt fences and straw bales are in working order.

The following describes the monitoring approach for Years 1 through 5.

7.4.1 Schedule

An initial stem count of the installed vegetation will be conducted following construction (an as-built count). Monitoring of mitigation areas will continue annually for 5 years post-construction. A qualified biologist or landscape designer will conduct the monitoring. The as-built plan will be used as the basis for monitoring of plant survival. Monitoring will begin the first full growing season after construction is complete and the plants have been installed.

7.4.2 Data Collection

Shrub and tree cover will be evaluated quantitatively and qualitatively 1 year after construction, as well as in Years 2, 3, 4, and 5. Data collection will occur during the late summer (i.e., July–September). The following information will be recorded during each of the monitoring site visits:

- Survival rates of installed vegetation during plant warranty period based on sub-sample of the mitigation area (e.g., plots, line-intercept transects).
- General plant health assessment and plant aerial coverage from established sampling points and transects (e.g., line-intercept).
- Presence of undesirable plants (weedy and/or non-native species) with estimated percent cover.
- Photo documentation of site conditions from established photo points.
- Impacts to the wetland buffer from human use (e.g., dumping of debris).
- Signs of wildlife use.

7.4.3 Reporting

Monitoring reports will be prepared by a qualified biologist or landscape designer for review and approval by regulatory agencies during monitoring Years 1 through 5. The reports will compare the performance standards described in the mitigation plan to the field observations during monitoring, and will recommend species replacements or other maintenance activities, if necessary (see Maintenance section below). Reports will present data collected during the site visits and document success in meeting specific performance standards. Photographs will illustrate and document site conditions. Monitoring reports will be submitted by the end of each monitoring year to the City (Development Services Department).

7.5 Maintenance

Maintenance of the mitigation area will begin after completion of the Project and continue, as needed, for 5 years. After the initial planting acceptance by the project biologist, the landscaping contractor will be responsible for plant survival for a period of 1 year. The County will provide maintenance, as necessary. Maintenance could include, but may not be limited to, the following:

- Irrigate during dry periods;
- Remove non-native or invasive plant species;
- Add soil amendments and/or mulch;
- Install fencing around woody plants to prevent animal damage;
- Construct fencing to prevent vandalism or damage caused by humans; and
- Install supplemental plantings as needed.

Based on monitoring results, the County will implement required maintenance and will determine how corrective measures will be addressed (e.g., which department[s] will provide funding) should they be necessary.

7.6 Contingency

The City will implement a contingency plan in conjunction with the permitting authorities if the mitigation site fails to meet the success criteria. The above-described maintenance section may remedy specific problems such as the failure of any species specified by the planting plan, before a formal contingency plan is required. Contingency plans are prepared on a case-by-case basis to remedy the aspect of the restoration that does not meet the goals and objectives of the mitigation plan. For example, if plant success rates are not meeting the success criteria even after maintenance replanting is performed, contingency actions will be enacted.

7.7 Site Protection

The City will implement measures, consisting of a protective covenant or conservation easement, that will protect the mitigation in perpetuity by precluding future use of the area (except for the purposes of enhancing or restoring the mitigation associated with the Project). The implemented measure will be recorded with the City of Issaquah's Assessor's office. Documented proof of the protective covenant will be provided to the regulatory agencies.

8 LIMITATIONS

Within the limitations of schedule, budget, scope-of-work, and seasonal constraints, we warrant that this study was conducted in accordance with generally accepted environmental science practices, including the technical guidelines and criteria in effect at the time this study was performed, as outlined in the Methods section (Appendix A). The results and conclusions of this report represent the authors' best professional judgment, based upon information provided by the project proponent in addition to that obtained during the course of this study. No other warranty, expressed or implied, is made.

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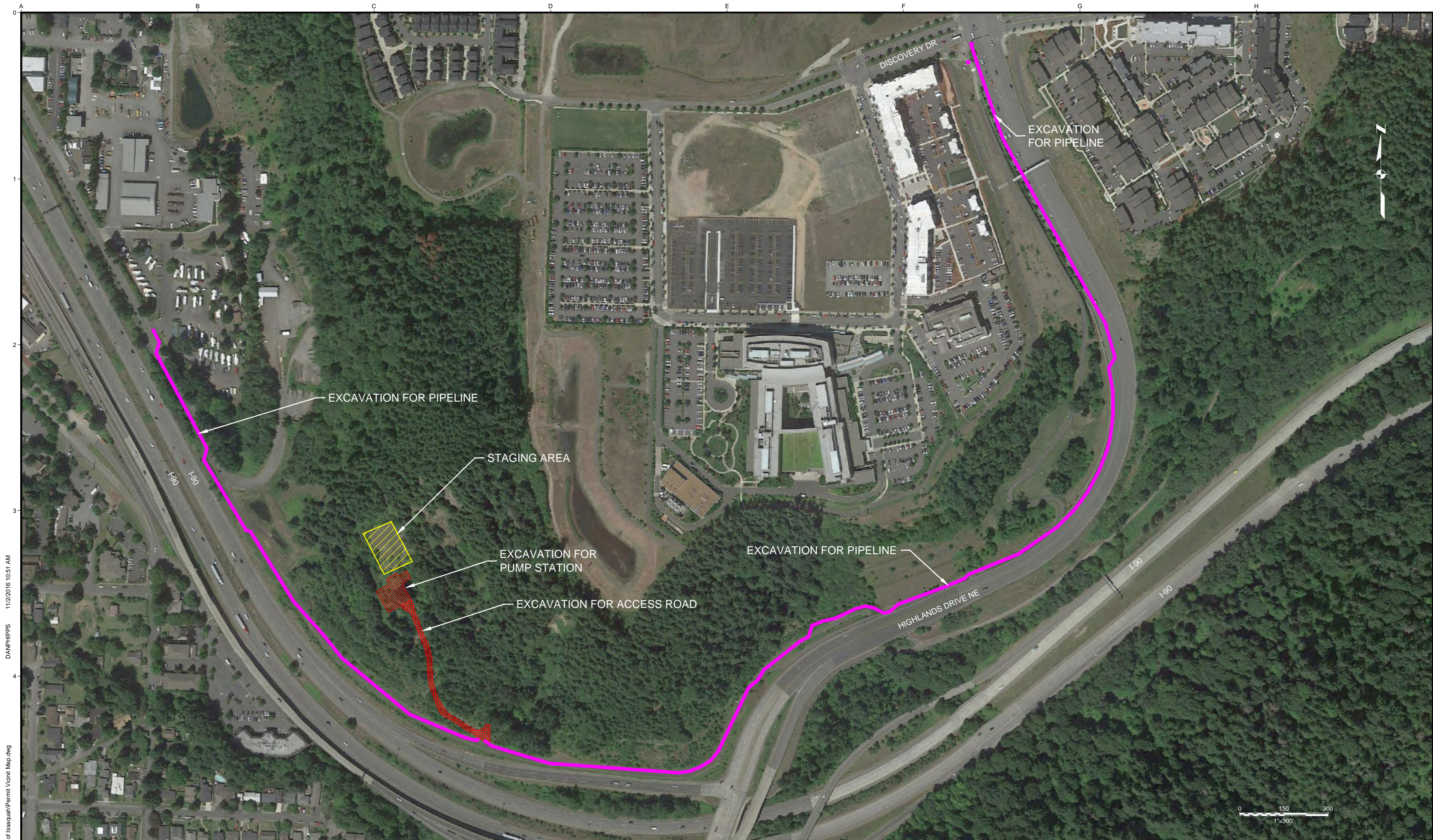
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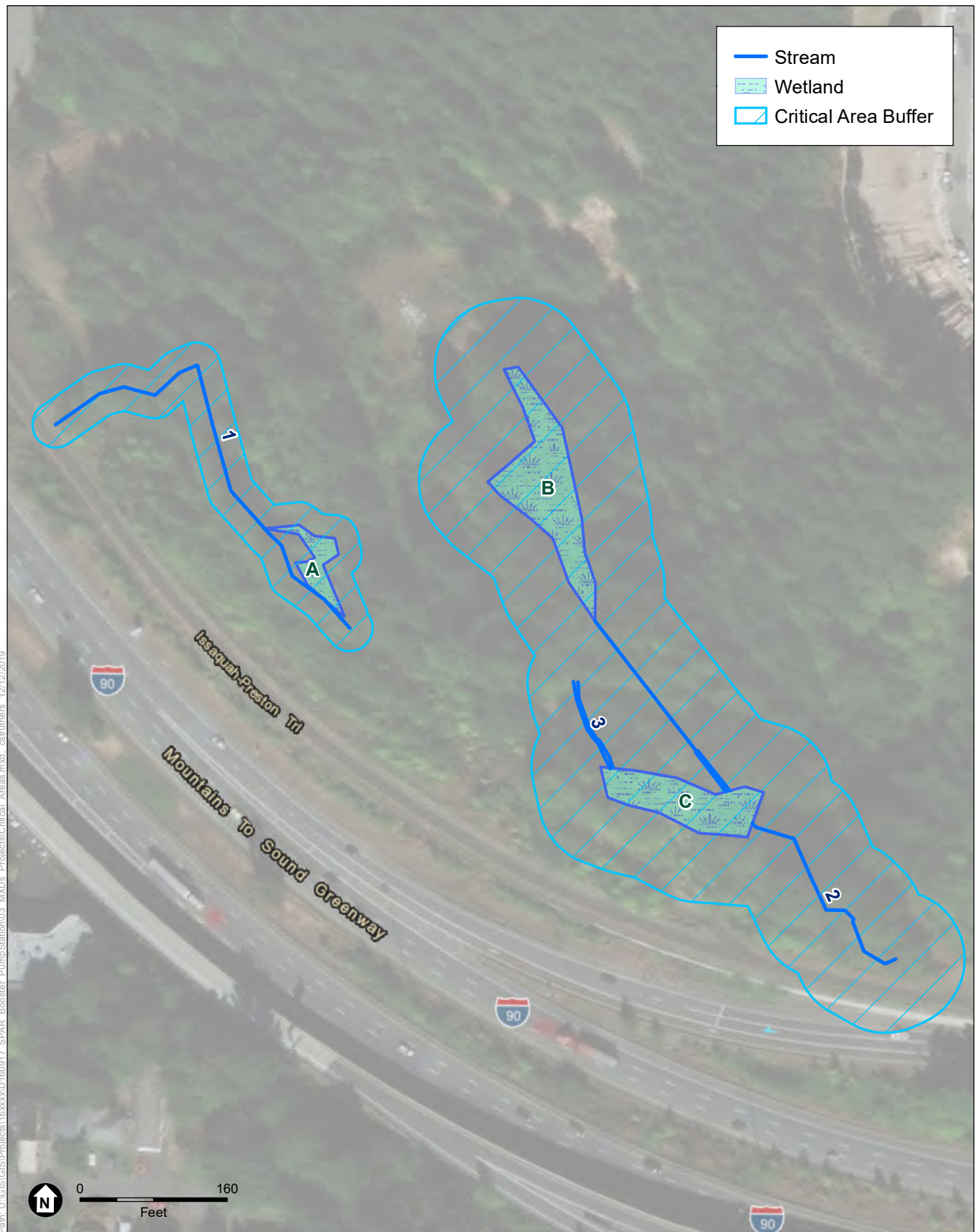
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Figures and Photographs



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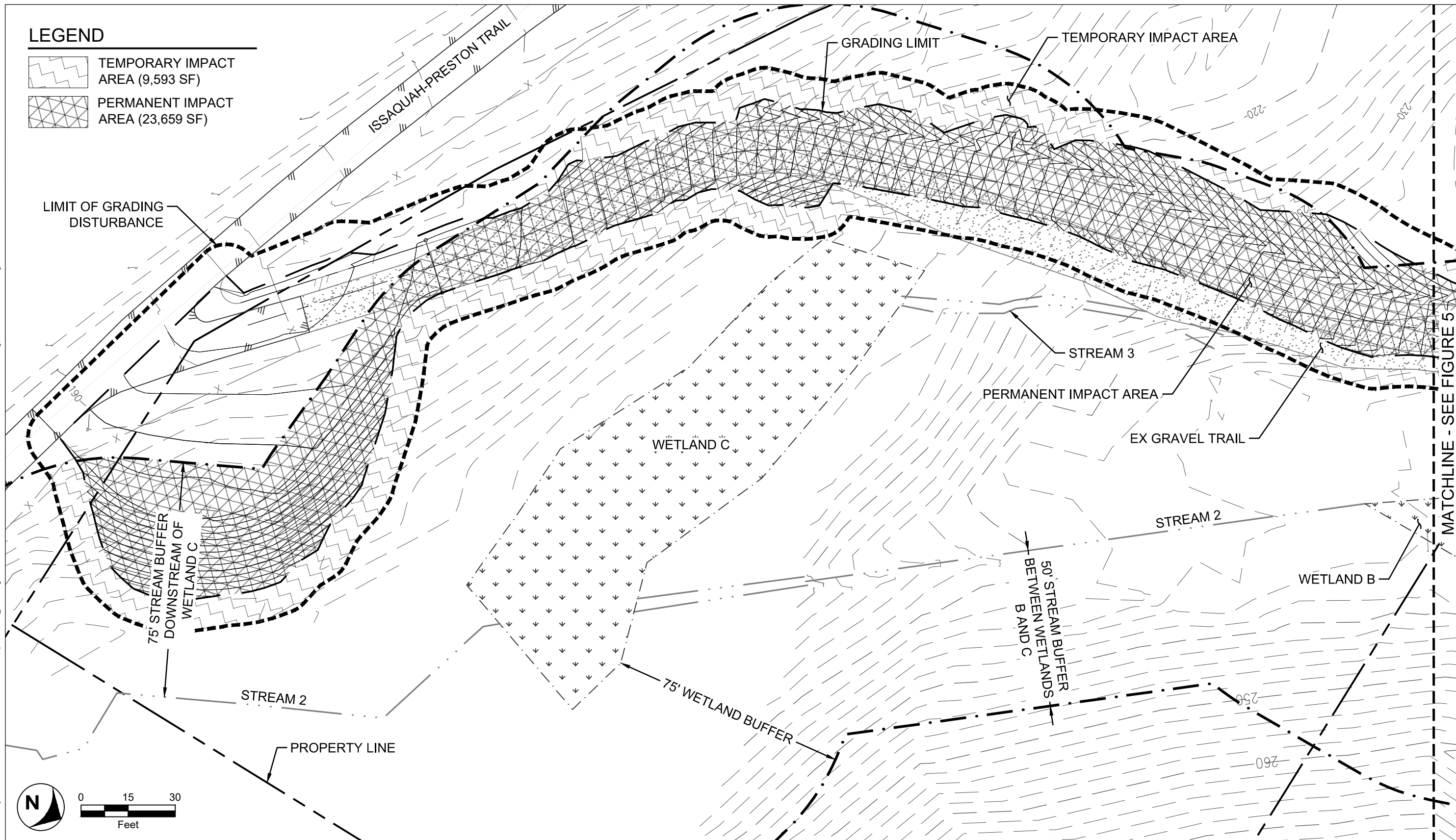


SOURCE: ESA, 2017; NAIP, 2015

S SPAR Boost Pump Station

Figure 3
Critical Areas
Issaquah, WA

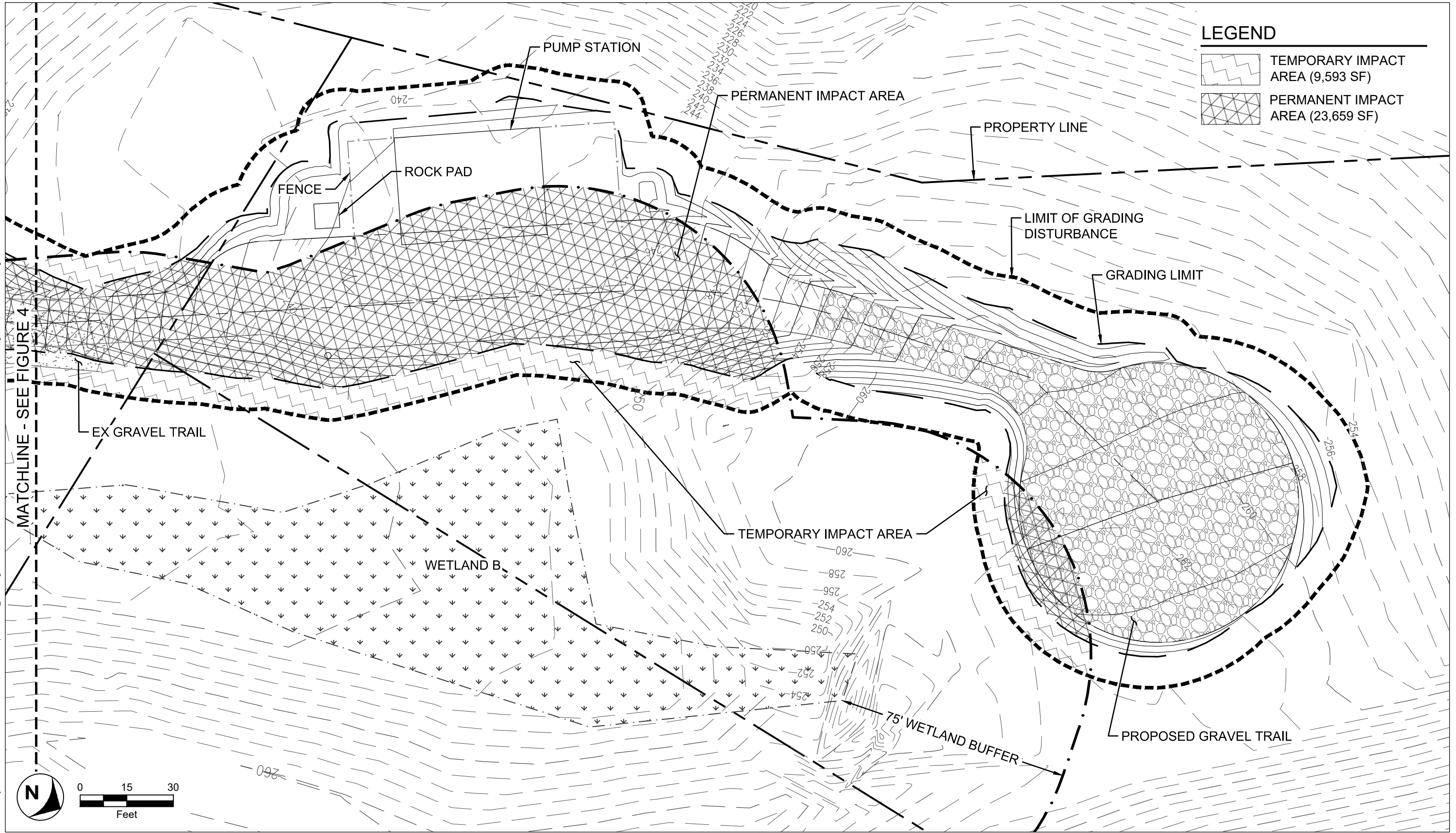
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South Issaquah Booster Pump Station (SPAR)

Figure 4
BUFFER IMPACTS TO CRITICAL
AREAS SOUTH

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South Issaquah Booster Pump Station (SPAR)

Figure 5
BUFFER IMPACTS TO CRITICAL
AREAS NORTH

LEGEND

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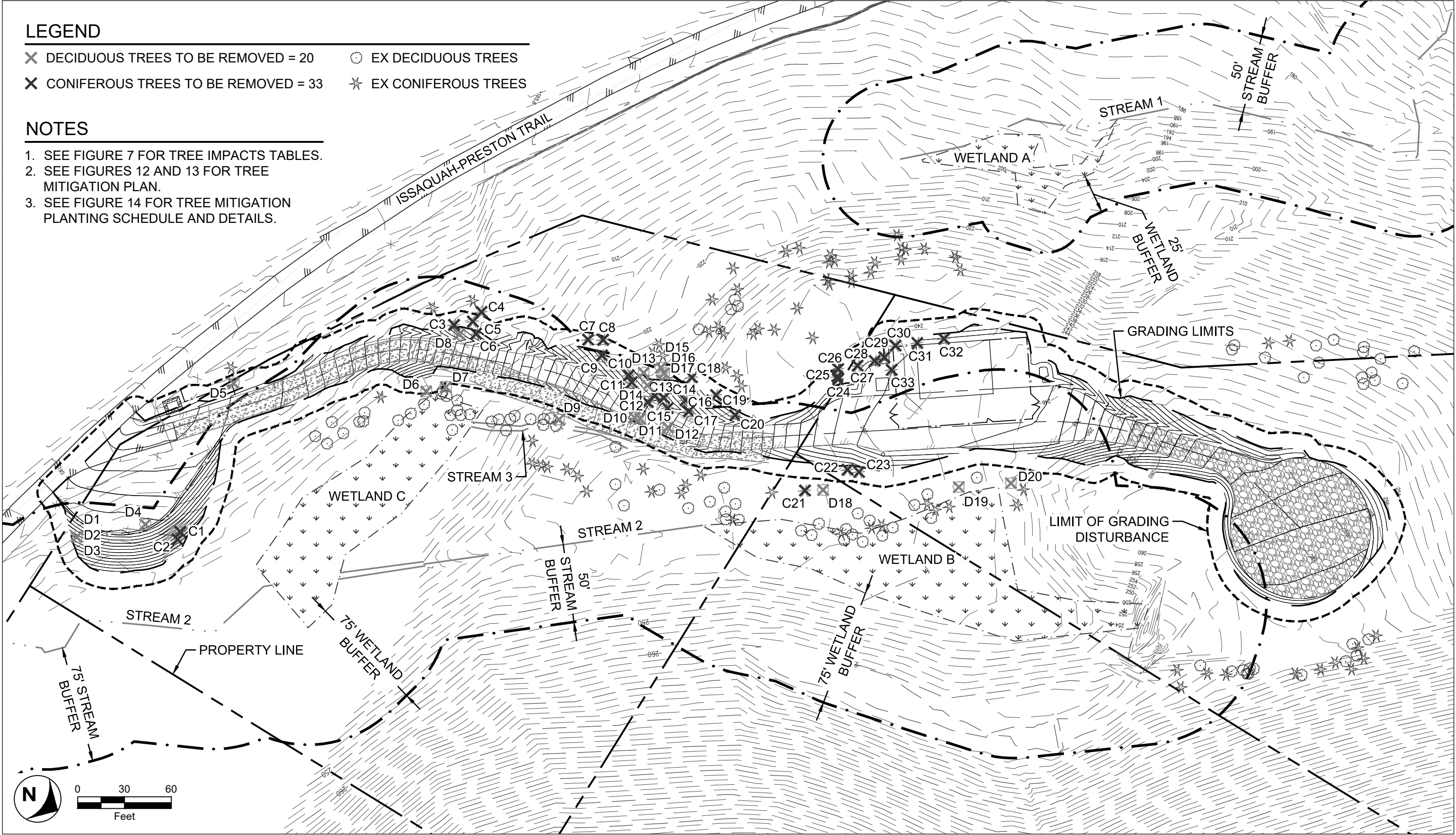
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EX CONIFEROUS TREES

NOTES

1. SEE FIGURE 7 FOR TREE IMPACTS TABLES.
2. SEE FIGURES 12 AND 13 FOR TREE MITIGATION PLAN.
3. SEE FIGURE 14 FOR TREE MITIGATION PLANTING SCHEDULE AND DETAILS.



South Issaquah Booster Pump Station (SPAR)

Figure 6
TREE IMPACTS PLAN

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DECIDUOUS TREE REMOVAL TABLE		
TREE #	SPECIES	SIZE (DBH)
D1	BIGLEAF MAPLE	7
D2	BIGLEAF MAPLE	5
D3	BIGLEAF MAPLE	4
D4	DECIDUOUS	22
D5	ALDER	6
D6	COTTONWOOD	14
D7	COTTONWOOD	18
D8	COTTONWOOD	20
D9	ALDER	7
D10	ALDER	7
D11	ALDER	6
D12	ALDER	6
D13	COTTONWOOD	7
D14	ALDER	7
D15	COTTONWOOD	23
D16	COTTONWOOD	13
D17	COTTONWOOD	19
D18	COTTONWOOD	17
D19	ALDER	13
D20	COTTONWOOD	38
COMBINED DBH TOTAL:		259

CONIFEROUS TREE REMOVAL TABLE		
TREE #	SPECIES	SIZE (DBH)
C1	DOUGLAS FIR	13
C2	DOUGLAS FIR	9
C3	DOUGLAS FIR	9
C4	DOUGLAS FIR	13
C5	DOUGLAS FIR	7
C6	DOUGLAS FIR	10
C7	DOUGLAS FIR	17
C8	DOUGLAS FIR	16
C9	DOUGLAS FIR	15
C10	DOUGLAS FIR	6
C11	DOUGLAS FIR	14
C12	DOUGLAS FIR	9
C13	DOUGLAS FIR	13
C14	DOUGLAS FIR	6
C15	DOUGLAS FIR	8
C16	DOUGLAS FIR	17
C17	DOUGLAS FIR	8
C18	DOUGLAS FIR	6
C19	DOUGLAS FIR	10
C20	DOUGLAS FIR	19
C21	DOUGLAS FIR	18
C22	DOUGLAS FIR	25
C23	DOUGLAS FIR	12
C24	DOUGLAS FIR	12
C25	DOUGLAS FIR	9

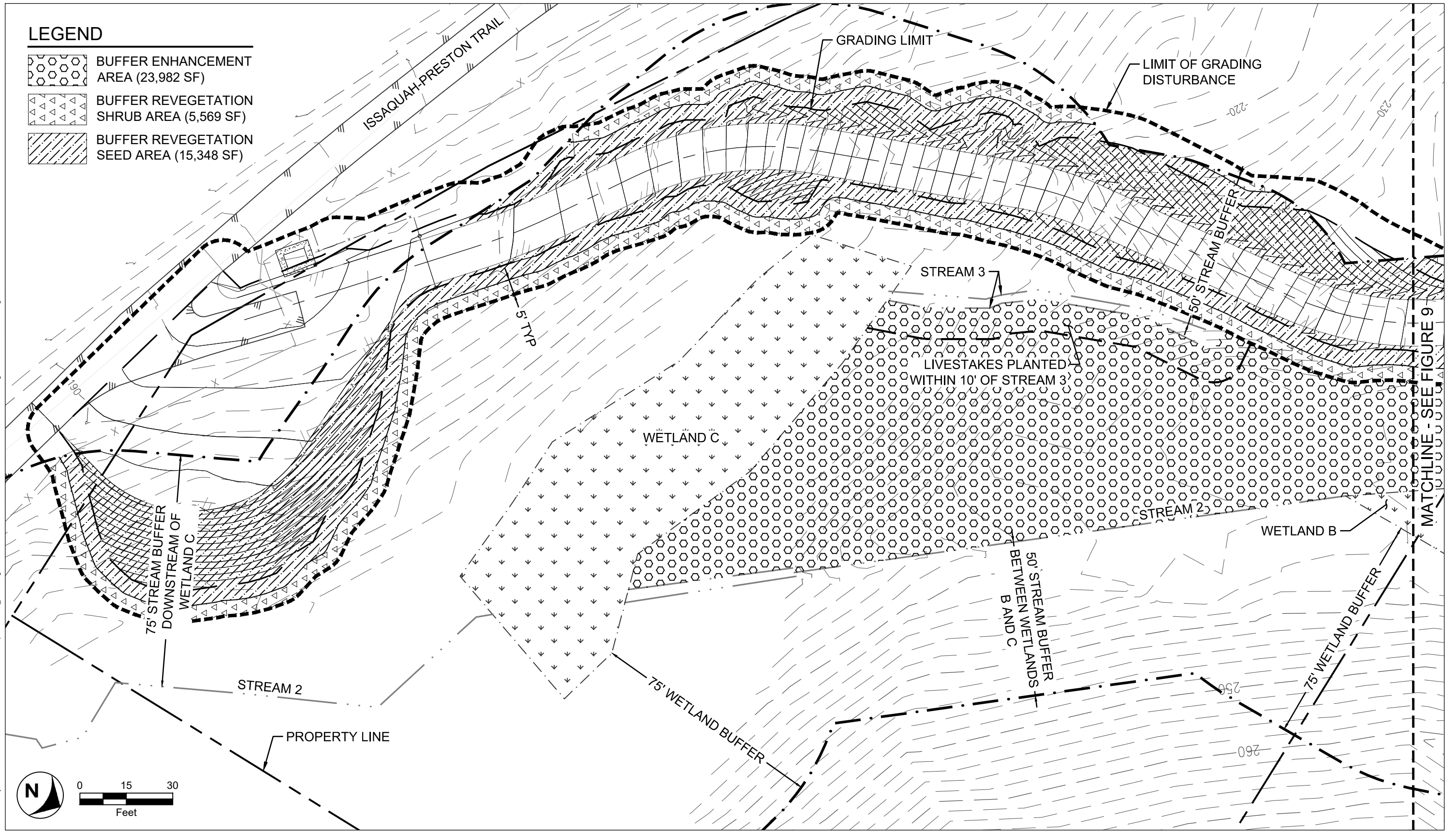
CONIFEROUS TREE REMOVAL TABLE		
TREE #	SPECIES	SIZE (DBH)
C26	DOUGLAS FIR	13
C27	DOUGLAS FIR	13
C28	DOUGLAS FIR	14
C29	DOUGLAS FIR	12
C30	DOUGLAS FIR	15
C31	DOUGLAS FIR	9
C32	DOUGLAS FIR	17
C33	DOUGLAS FIR	16
COMBINED DBH TOTAL:		410

South Issaquah Booster Pump Station (SPAR)

Figure 7
TREE IMPACTS TABLE



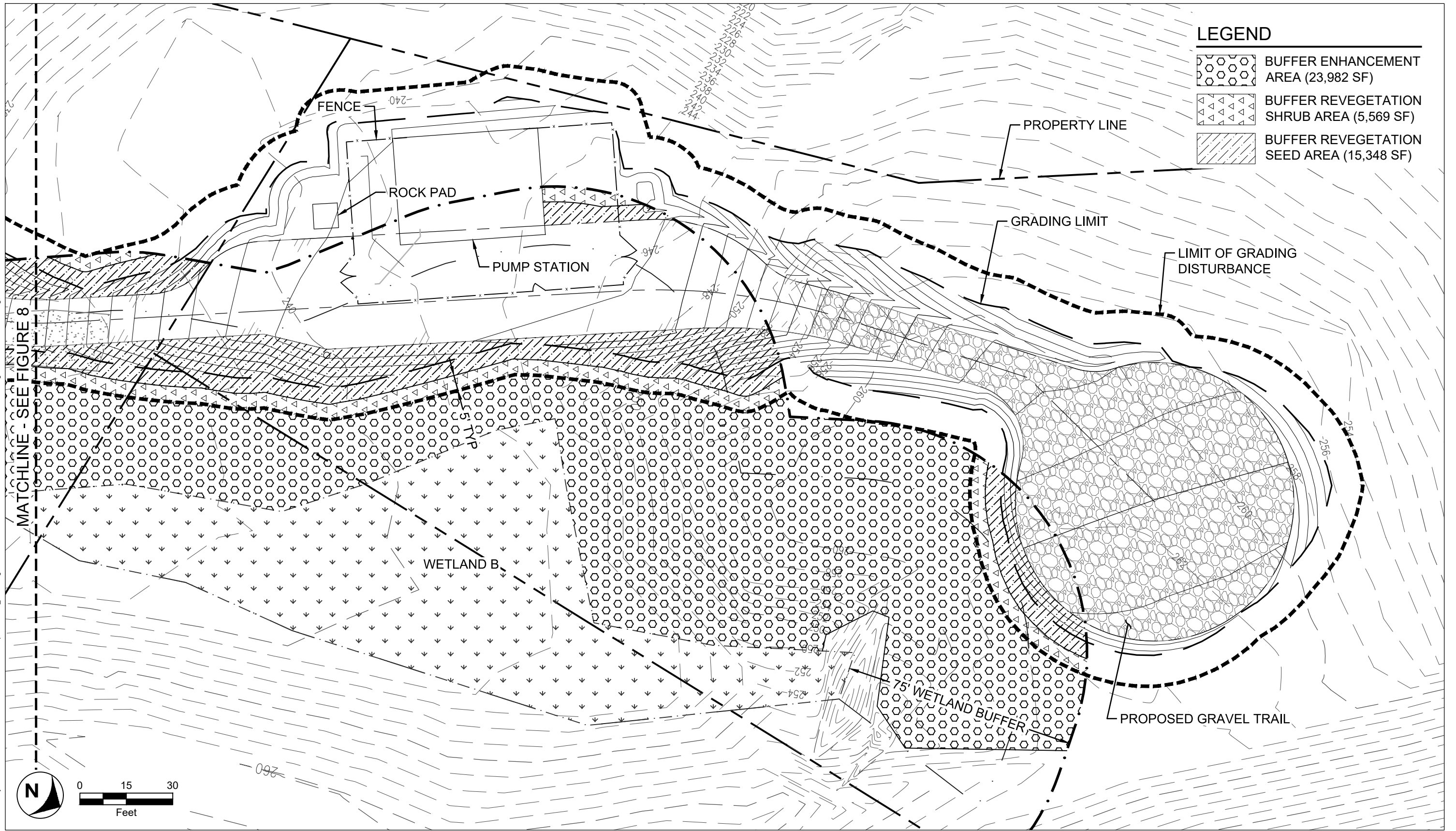
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South Issaquah Booster Pump Station (SPAR)

Figure 8
BUFFER MITIGATION PLAN SOUTH

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South Issaquah Booster Pump Station (SPAR)

Figure 9
BUFFER MITIGATION PLAN NORTH

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BUFFER ENHANCEMENT PLANTING NOTES

CLEARING AND TREE PROTECTION

1. USING HAND-HELD EQUIPMENT, REMOVE ALL INVASIVE SPECIES FROM THE MITIGATION AREA PRIOR TO INSTALLATION USING METHODS APPROVED BY THE STATE OF WASHINGTON NOXIOUS WEED CONTROL BOARD. SPECIFIC SPECIES TO BE REMOVED INCLUDE HIMALAYAN BLACKBERRY (RUBUS ARMENIACUS), ENGLISH IVY (HEDERA HELIX), ENGLISH HOLLY (ILEX AQUIFOLIUM), KNOTWEED (POLYGONUM SPP.), AND REED CANARYGRASS (PHALARIS ARUNDINACEA).
2. PRESERVE AND PROTECT ALL EXISTING WETLANDS, TREES AND VEGETATION NOT DESIGNATED FOR REMOVAL. PROVIDE, ERECT AND MAINTAIN TEMPORARY FENCING TO PREVENT ACCESS TO EXISTING WETLANDS OR WETLAND BUFFERS BY ANY VEHICLES.
3. DO NOT DRIVE OR PARK ANY VEHICLES OR EQUIPMENT, STORE MATERIALS, STOCKPILE SOIL OR GRAVEL, OR DISPOSE OF ANY CONSTRUCTION OR WASTE MATERIAL WITHIN EXISTING WETLANDS OR WETLAND BUFFER OR NEAR NEWLY INSTALLED PLANTS. RESTRICT FOOT TRAFFIC WITHIN PROTECTED AREAS.

PLANTING

4. ASSUME TRIANGULAR SPACING FOR ALL PLANT SPACING ON PLANTING SCHEDULES.
5. PLANTING AREAS SHOULD BE STAKED IN THE FIELD FOR ACCEPTANCE BY THE ENGINEER PRIOR TO INSTALLATION.
6. PRIOR TO PLANTING, PLACE ALL PLANTS AS INDICATED ON THE PLANS, OR MARK EACH LOCATION WITH WOOD STAKES OR COLOR WIRE FLAGS MARKED WITH THE FIRST TWO LETTERS OF BOTH PLANT GENUS AND SPECIES (E.G. PH CA FOR PHYSOCARPUS CAPITATUS). NO PLANTING HOLES SHALL BE DUG OR BACKFILLED WITHOUT PRIOR APPROVAL OF ENGINEER. NOTIFY ENGINEER A MINIMUM OF 72 HOURS BEFORE PLANTING TO ALLOW AMPLE TIME TO ADJUST PLANT LOCATIONS. PROVIDE EXTRA STAKES OR FLAGS SUFFICIENT TO MARK LOCATIONS OF PLANTS NOT LOCATED ON PLAN.
7. APPLY BUFFER REVEGETATION SEED MIX ALONG ROADSIDE AREAS AS SHOWN ON PLANS AND IN BUFFER AREAS WHERE PLANTING HAS NOT BEEN LOCATED BUT HAS BEEN IMPACTED DURING PLANTING AND GRADING WORK.

SOIL TREATMENT & PLANTING SEQUENCE

1. CLEAR AND GRUB, TAKING CARE TO REMOVE LARGE ROCKS AND THICKETS
2. COMPOST SOIL AMENDMENT IN AREAS TO BE PLANTED OR SEEDED
3. SEED, MULCH, AND EROSION CONTROL BLANKET
4. INSTALL 3" DEPTH WOOD CHIP MULCH IN ALL PLANTING AREAS EXCEPT LIVE STAKE AREAS
5. INFILL PLANTING: TREE AND SHRUBS

BUFFER ENHANCEMENT PLANTING SCHEDULE (23,982 SF)

BOTANICAL NAME	COMMON NAME	SIZE	SPACING	QUANTITY
TREES:				
PICEA SITCHENSIS	SITKA SPRUCE	1 GAL.	10' O.C.	53
PSEUDOTSUGA MENZIESII	DOUGLAS FIR	1 GAL.	10' O.C.	53
RHAMNUS PURSHIANA	CASCARA	1 GAL.	10' O.C.	52
SALIX LUCIDA	PACIFIC WILLOW	1 GAL.	10' O.C.	52
THUJA PLICATA	WESTERN RED CEDAR	1 GAL.	10' O.C.	53
SHRUBS:				
ACER CIRCINATUM	VINE MAPLE	1 GAL.	5' O.C.	131
LONICERA INVOLUCRATA	TWINBERRY	1 GAL.	5' O.C.	132
MAHONIA AQUIFOLIUM	TALL ORGEON GRAPE	1 GAL.	5' O.C.	131
OEMLERIA CERASIFORMIS	INDIAN PLUM	1 GAL.	5' O.C.	131
PHYSOCARPUS CAPITATUS	PACIFIC NINEBARK	1 GAL.	5' O.C.	131
RIBES LACUSTRE	PRICKLY CURRANT	1 GAL.	5' O.C.	131
LIVESTAKES:				
SALIX HOOKERIANA	HOOKEER'S WILLOW	LIVESTAKE	3' O.C.	54
SALIX LASIANDRA	PACIFIC WILLOW	LIVESTAKE	3' O.C.	53
SALIX SITCHENSIS	SITKA WILLOW	LIVESTAKE	3' O.C.	54

BUFFER REVEGETATION SHRUB PLANTING SCHEDULE (5,569 SF)

BOTANICAL NAME	COMMON NAME	SIZE	SPACING	QUANTITY
SHRUBS:				
ACER CIRCINATUM	VINE MAPLE	1 GAL.	5' O.C.	30
LONICERA INVOLUCRATA	TWINBERRY	1 GAL.	5' O.C.	30
MAHONIA AQUIFOLIUM	TALL ORGEON GRAPE	1 GAL.	5' O.C.	30
OEMLERIA CERASIFORMIS	INDIAN PLUM	1 GAL.	5' O.C.	29
PHYSOCARPUS CAPITATUS	PACIFIC NINEBARK	1 GAL.	5' O.C.	30
RIBES LACUSTRE	PRICKLY CURRANT	1 GAL.	5' O.C.	30

BUFFER REVEGETATION SEED SCHEDULE (15,348 SF)

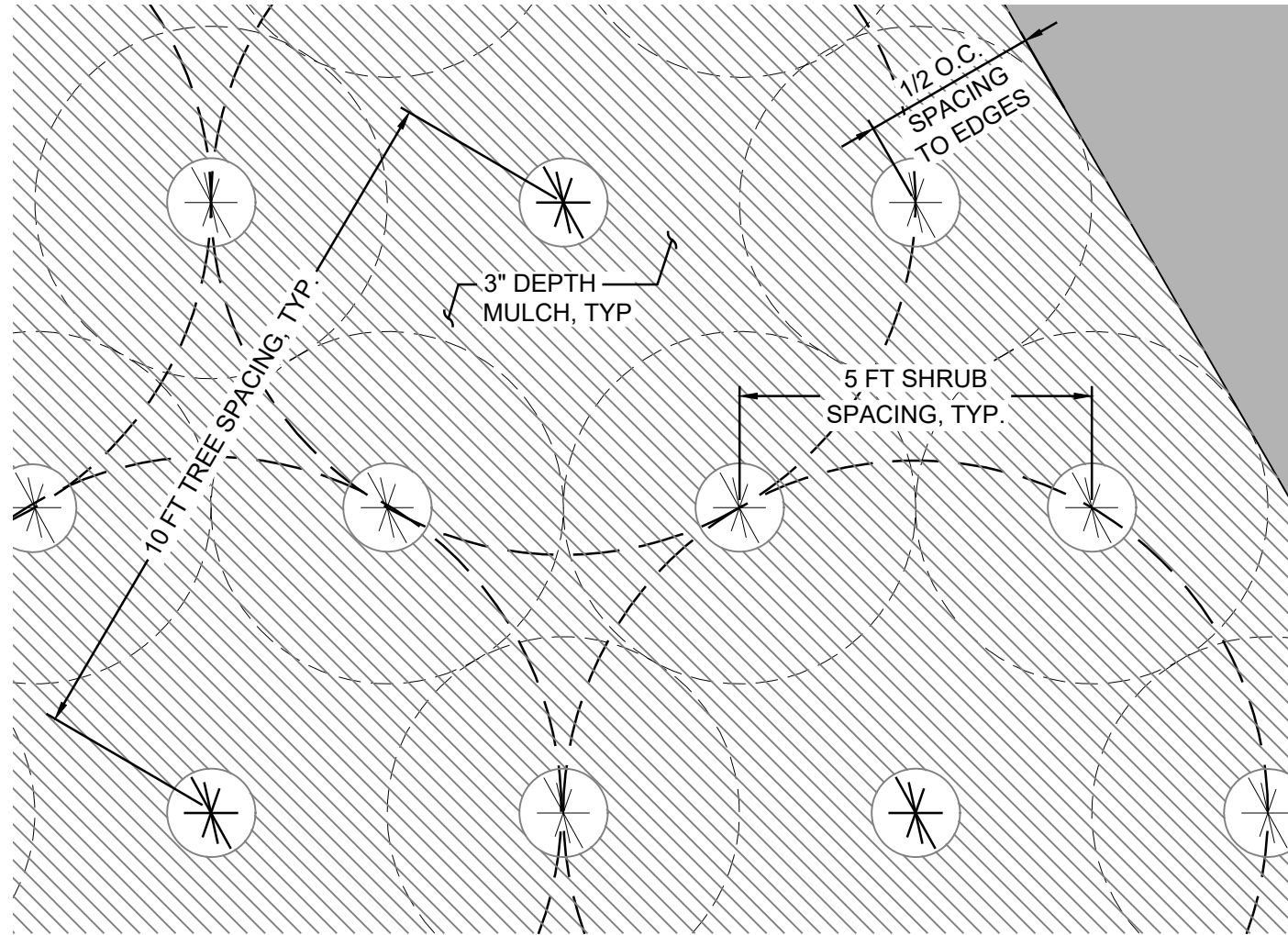
BOTANICAL NAME	COMMON NAME	DISTRIBUTION	RATE
AGROSTIS EXARATA	SPIKE BENTGRASS	10%	APPLY 20 LBS. PER ACRE
DESCHAMPSIA CESPITOSA	TUFTED HAIRGRASS	15%	
DESCHAMPSIA ELONGATA	SLENDER HAIRGRASS	20%	
HORDEUM BRACHYANTHERUM	MEADOW BARLEY	55%	

South Issaquah Booster Pump Station (SPAR)

Figure 10
BUFFER MITIGATION PLANTING
SCHEDULES AND NOTES



DWG: U:\Projects\SEA\16xxxx\1610917.00 S SPAR Booster Pump Station\08_CADD\Drawings\FINAL MIT FIGURES\11 BUFFER MITIGATION PLANTING DETAILS.dwg USER: Sona Greenberg PLOT DATE: 12/31/2019 9:48:24 AM



NOTES:

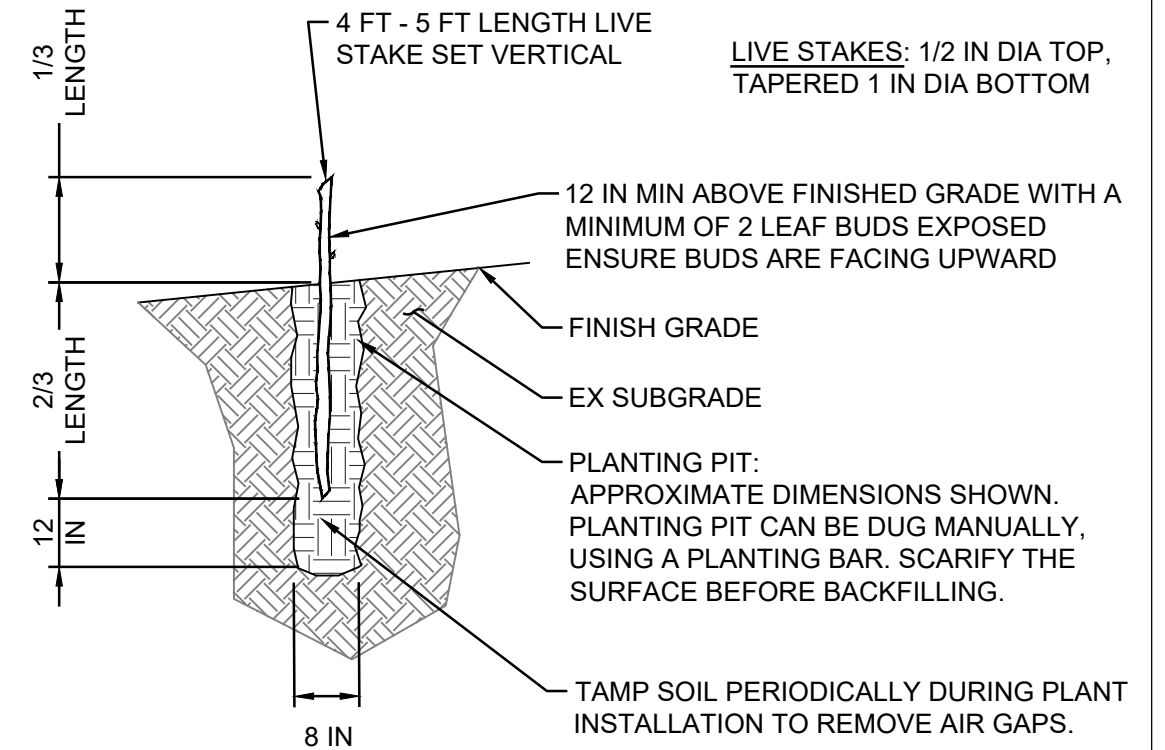
1. PLANTING LAYOUT IS CONCEPTUAL AND INTENDED TO SHOW GROUPINGS OF SIMILAR SPECIES OF PLANTS.
3. GROUP EACH SPECIES IN ODD-NUMBERED CLUSTERS OF 3 TO 9 EXCEPT WHERE NOTED OTHERWISE.
4. PLANT LAYOUT AND TRIANGULAR SPACING MAY BE ADJUSTED TO MEET FIELD CONDITIONS WITH THE ACCEPTANCE OF THE ENGINEER.
5. SURROUND EACH TREE WITH SHRUBS, RETAINING THE 5 FT O.C. SPACING OF THE SHRUBS AS SHOWN IN THIS DETAIL.

1 PLANTING LAYOUT

DETAIL

SCALE: NOT TO SCALE

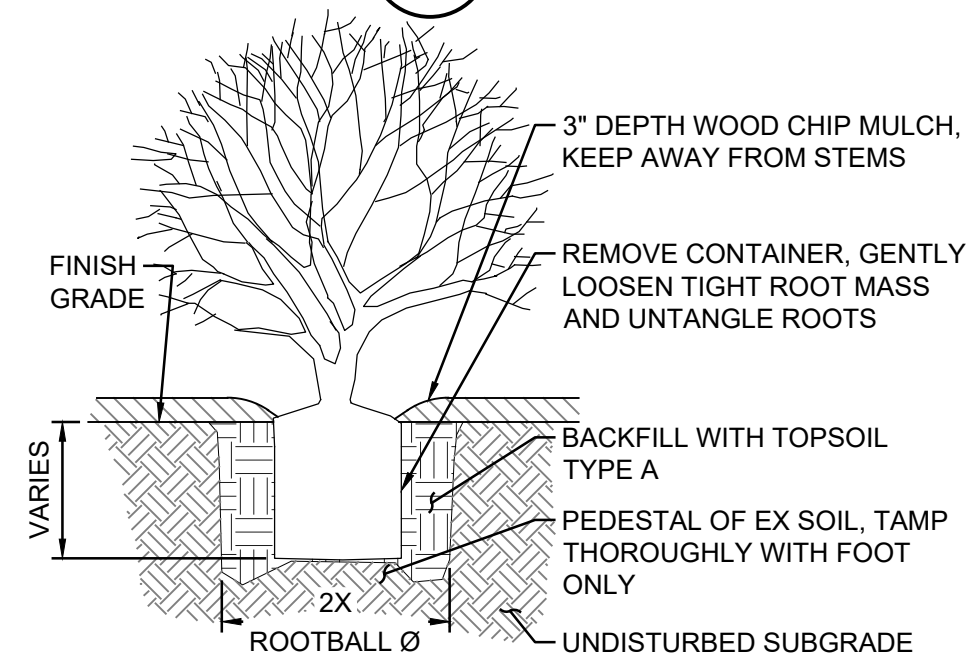
NOTE: SEE FIGURE 14 FOR SLOPE PLANTING DETAIL.



2 LIVESTAKE PLANTING

DETAIL

SCALE: NOT TO SCALE



3 CONTAINER PLANTING

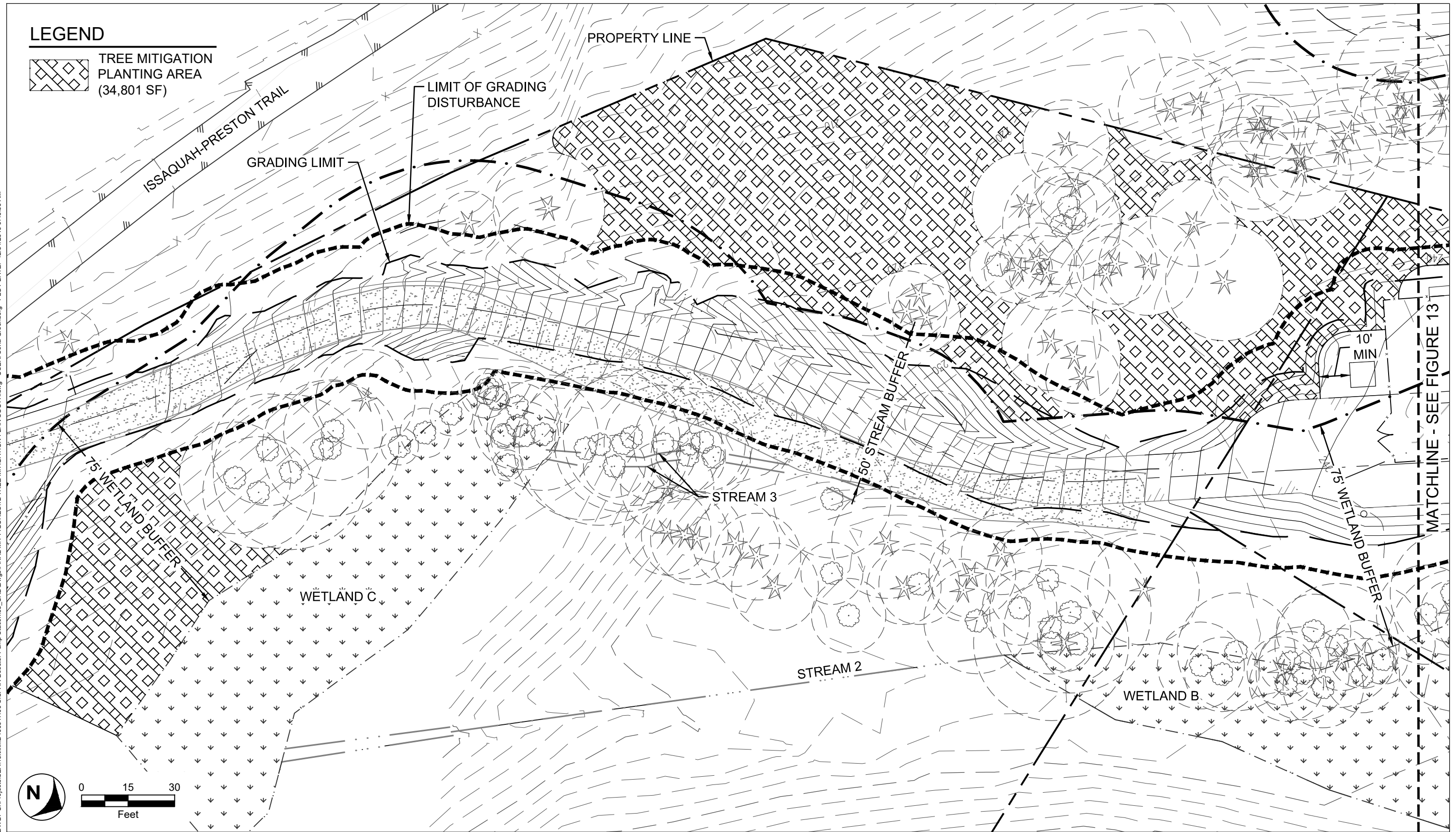
DETAIL

SCALE: NOT TO SCALE

South Issaquah Booster Pump Station (SPAR)

Figure 11
BUFFER MITIGATION PLANTING
DETAILS

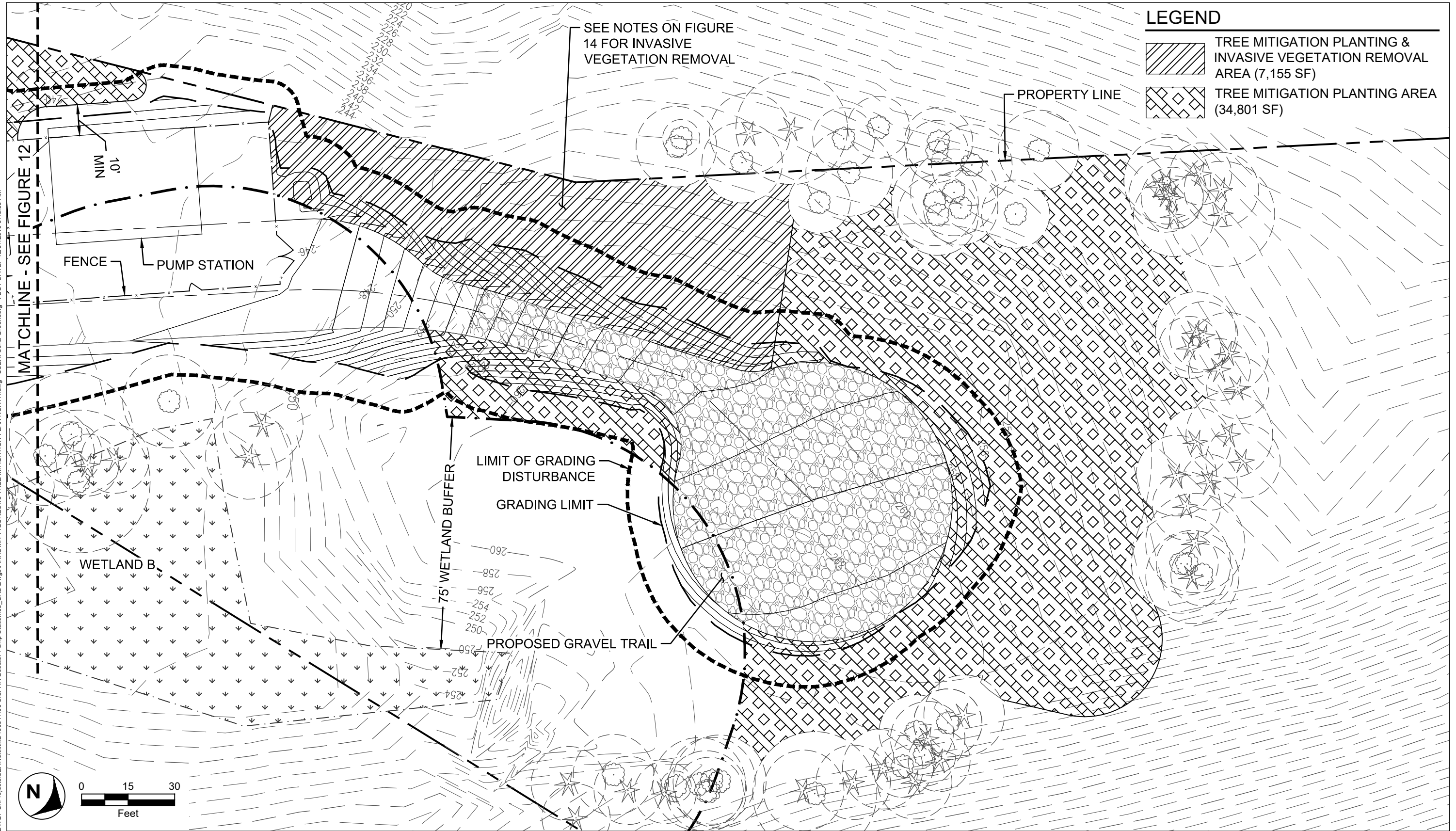
DWG: U:\Projects\SEA 16xxxx\1610917.00 S SPAR Booster Pump Station\08 CAD\Drawings\FINAL MIT FIGURES\12 TREE MITIGATION PLAN SOUTH.dwg USER: Sona Greenberg PLOT DATE: 12/31/2019 9:48:39 AM



South Issaquah Booster Pump Station (SPAR)

Figure 12
TREE MITIGATION PLAN SOUTH

DWG: U:\Projects\SEA\16xxxx\1610917.00 S SPAR Booster Pump Station\08_CADD\Drawings\FINAL MIT FIGURES\13 TREE MITIGATION PLAN NORTH.dwg USER: Sona Greenberg PLOT DATE: 12/31/2019 9:48:53 AM



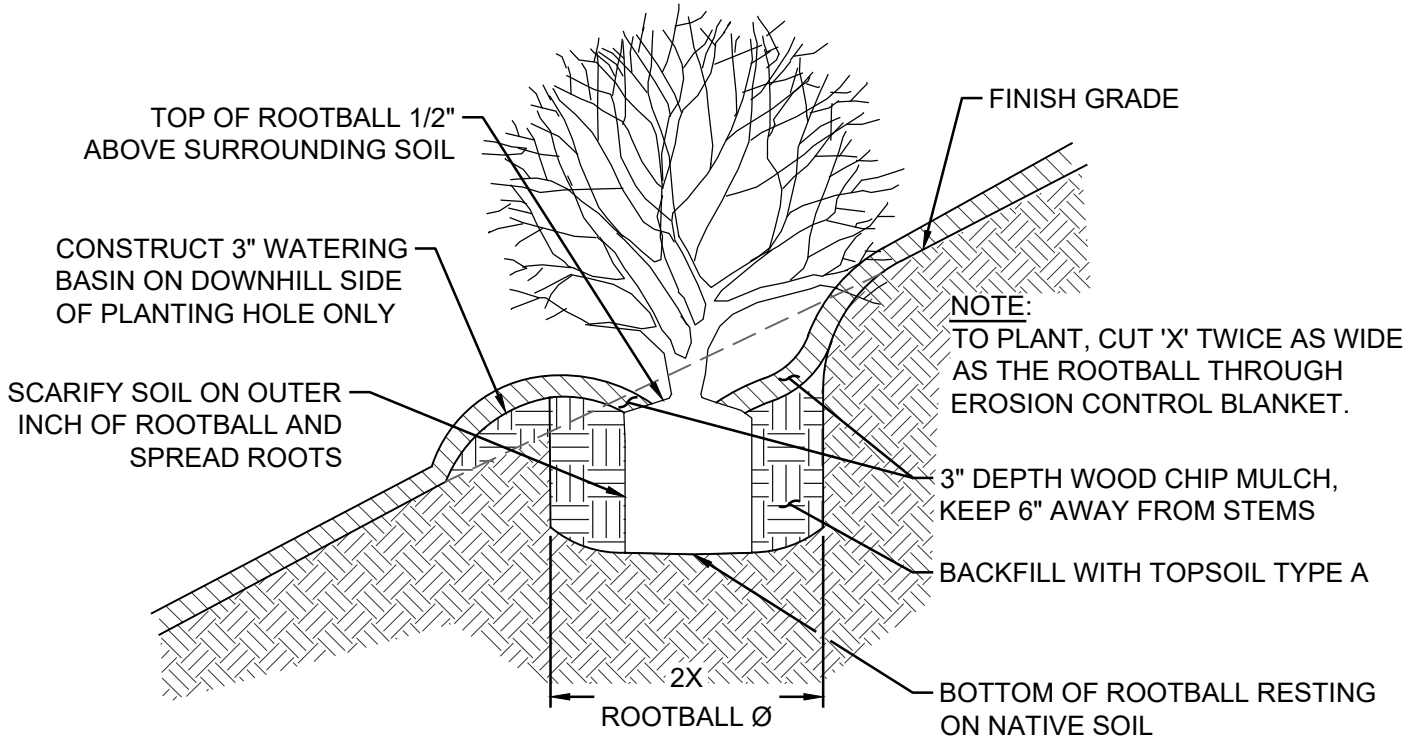
South Issaquah Booster Pump Station (SPAR)

Figure 13
TREE MITIGATION PLAN NORTH

DWG: U:\Projects\SEA\16xxxx\160917.00 S SPAR Booster Pump Station\08_CADD\08gs\FINAL MIT FIGURES\14 TREE MITIGATION SCHEDULE AND DETAILS.dwg USER: Sona Greenberg PLOT DATE: 12/31/2019 9:48:59 AM

TREE MITIGATION PLANTING NOTES

- 1. USING HAND-HELD EQUIPMENT, REMOVE ALL INVASIVE SPECIES FROM THE "TREE MITIGATION PLANTING & INVASIVE VEGETATION REMOVAL" ZONE OF THE MITIGATION AREA PRIOR TO INSTALLATION USING METHODS APPROVED BY THE STATE OF WASHINGTON NOXIOUS WEED CONTROL BOARD. SPECIFIC SPECIES TO BE REMOVED INCLUDE HIMALAYAN BLACKBERRY (RUBUS ARMENIACUS) AND SCOTCH BROOM (CYTISUS SCOPARIUS).
- 2. PRESERVE AND PROTECT ALL EXISTING WETLANDS, TREES AND VEGETATION NOT DESIGNATED FOR REMOVAL. PROVIDE, ERECT AND MAINTAIN TEMPORARY FENCING TO PREVENT ACCESS TO EXISTING WETLANDS OR WETLAND BUFFERS BY ANY VEHICLES.
- 3. DO NOT DRIVE OR PARK ANY VEHICLES OR EQUIPMENT, STORE MATERIALS, STOCKPILE SOIL OR GRAVEL, OR DISPOSE OF ANY CONSTRUCTION OR WASTE MATERIAL WITHIN EXISTING WETLANDS OR WETLAND BUFFER OR NEAR NEWLY INSTALLED PLANTS. RESTRICT FOOT TRAFFIC WITHIN PROTECTED AREAS.
- 4. SEED SOURCE MUST BE AS LOCAL AS POSSIBLE, AND PLANTS MUST BE NURSERY PROPAGATED UNLESS TRANSPLANTED FROM ON-SITE AREAS APPROVED FOR DISTURBANCE.
- 5. PLANTING AREAS AND GENERAL PLANT LAYOUT SHOULD BE CONFIRMED BY CONTRACTOR WITH CITY BIOLOGIST PRIOR TO PLANT INSTALLATION.
- 6. SUBSEQUENT TO PLANT DELIVERY, BUT PRIOR TO PLANT INSTALLATION, THE CITY WILL INSPECT THE PLANTS TO ENSURE PLANT QUANTITIES, SIZES, AND HEALTH ARE ADEQUATE AND PER THE PLANTING PLAN. UNLESS THE CITY SPECIFICALLY AUTHORIZES ANY CHANGES OR SUBSTITUTIONS, THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL PLANT TYPES AND NUMBERS PER THE PLANTING PLAN.
- 7. PLANT SIMILAR SPECIES TOGETHER IN CLUSTERS OF 3, 5, 7, OR 9. DO NOT PLANT ALL OF ONE SPECIES IN ANY PLANTING AREAS.
- 8. IMMEDIATELY AFTER PLANT INSTALLATION, ALL INDIVIDUAL TREES WILL BE MARKED WITH BRIGHTLY COLORED FLAGGING, TO ALLOW FOR EASY IDENTIFICATION DURING AS-BUILT INSPECTION AND SUBSEQUENT MONITORING EFFORTS.
- 9. IMMEDIATELY FOLLOWING PLANT INSTATLLATION THE CITY, OR ITS DESIGNEE, WILL CONDUCT AN AS BUILT SURVEY TO ENSURE ALL TREE PLANTING WAS INSTALLED ACCORDING TO THE PLANTING PLAN. THE CONTRACTOR IS REPSONSIBLE FOR INSTALLING PLANT TYPES AND NUMBERS PER THE PLANTING PLAN.



1 - SLOPE PLANTING
DETAIL
SCALE: NOT TO SCALE

NOTE: SEE FIGURE 11 FOR CONTAINER PLANTING DETAIL.

TREE MITIGATION PLANTING SCHEDULE

BOTANICAL NAME	COMMON NAME	SIZE	SPACING	QUANTITY
ACER MACROPHYLLUM	BIG LEAF MAPLE	1 GAL.	10' O.C.	50
ACER MACROPHYLLUM	BIG LEAF MAPLE	2 GAL.	12' O.C.	50
PSEUDOTSUGA MENZIESII	DOUGLAS FIR	1 GAL.	10' O.C.	200
PSEUDOTSUGA MENZIESII	DOUGLAS FIR	2.GAL.	12' O.C.	110
MAXIMUM AREA ALLOCATED FOR TREE MITIGATION = 41,956 SF				
MINIMUM AREA REQUIRED FOR PROPOSED TREES AT PRESCRIBED TREE SPACING INTERVALS = 41,616 SF				

South Issaquah Booster Pump Station (SPAR)

Figure 14
TREE MITIGATION SCHEDULE AND DETAILS





Photo 1: Inundated portion of Wetland A, forming the headwaters of Stream 1; looking to the southwest.



Photo 2: Inundated portion of Wetland B, looking to the east.



Photo 3: Southern extent of Wetland B (to the left) as wetland transitions to Stream 2 (to the right); looking to the southeast.



Photo 4: Inundated portion of Wetland C near the outlet of Stream 2; looking to the west.



Photo 5: Wetland C with Stream 3 discharge to the left; looking to the southeast.



Photo 6: Near the headwaters of Stream 1, looking to the southeast.



Photo 7: Western extent of Stream 1, looking downslope to the southwest, with the trail and I-90 in the background.



Photo 8: Stream 2 up-gradient from Wetland C, near a flow monitoring station; looking to the southeast.



Photo 9: Stream 2 flowing out of Wetland C, looking to the west.



Photo 10: Downstream extent of Stream 2 with metal culvert (with flow monitoring station) connecting two detention ponds and stack pipe with debris rack on the right bank.



Photo 11: Man-made stormwater ponds near the western project area extent.



Photo 12: Stream 3 with Wetland C in the background; looking to the south.

Appendix A

Methods

WETLAND DEFINITION AND DELINEATION

Wetlands are formally defined by the U.S. Army Corps of Engineers (Corps) (Federal Register, 1982), the Environmental Protection Agency (EPA) (Federal Register, 1988), the Washington Shoreline Management Act (SMA) of 1971 and the Washington State Growth Management Act (GMA) as follows:

... those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (Federal Register, 1982, 1986).

In addition, the SMA and the GMA definitions add:

Wetlands do not include those artificial wetlands intentionally created from non-wetland site, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990 that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those artificially created wetlands intentionally created from non-wetland areas to mitigate the conversion of wetlands.

Methods defined in Western Mountains, Valleys, and Coast Regional Supplement (Corps, 2010) to the U.S. Army Corps of Engineers 1987 Wetlands Delineation Manual (Manual) were used to determine the presence and extent of wetlands in the study area. These methods are also consistent with state requirements in WAC 173-22-035.

The methodology outlined in the manuals is based upon three essential characteristics of wetlands: (1) hydrophytic vegetation; (2) hydric soils; and (3) wetland hydrology. Field indicators of these three characteristics must all be present in order to determine that an area is a wetland (unless problem areas or atypical situations are encountered). These characteristics are discussed below.

The “routine on-site determination method” was used to determine wetland boundaries that had not been previously delineated. Formal data plots were established where information regarding each of the three wetland parameters (vegetation, soils, and hydrology) was recorded. This information was used to distinguish wetlands from non-wetlands. If wetlands were determined to be present within the study area, wetland boundaries were delineated with sequentially numbered colored pin flags or flagging. Data plot locations were also marked with colored flagging. Data sheets for each of the formal data plots evaluated for this project are provided in Appendix B.

Vegetation

Plants must be specially adapted for life under saturated or anaerobic conditions to grow in wetlands. The U.S. Fish and Wildlife Service (USFWS) has determined the estimated probability of each plant species’ occurrence in wetlands and has accordingly assigned a “wetland indicator status” (WIS) to each species. Plants are categorized as obligate (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), and upland (UPL). Definitions for each indicator status are listed below. Species with an

indicator status of OBL, FACW, or FAC are considered adapted for life in saturated or anaerobic soil conditions. Such species are referred to as “hydrophytic” vegetation.

Key to Wetland Indicator Status codes:

OBL Obligate: species that almost always occur wetlands under natural conditions (est. probability >99%).

FACW Facultative wetland: species that usually occur in wetlands (est. probability 67 to 99%), but are occasionally found in non-wetlands.

FAC Facultative: Species that are equally likely to occur in wetlands or non-wetlands (est. probability 34 to 66%).

FACU Facultative upland: species that usually occur in non-wetlands (est. probability 67 to 99%), but are occasionally found in wetlands.

UPL Upland: species that almost always occur in non-wetlands under normal conditions (est. probability >99%).

Areas of relatively homogeneous vegetative composition can be characterized by “dominant” species. The indicator status of the dominant species within each vegetative stratum is used to determine if the plant community may be characterized as hydrophytic. The vegetation of an area is considered to be hydrophytic if more than 50% of the dominant species have an indicator status of OBL, FACW, or FAC. The Regional Supplement provides additional tests for evaluating the presence of hydrophytic vegetation communities including the prevalence index, morphological adaptations, and wetland non-vascular plants. The Supplement also addresses difficult situations where hydrophytic vegetation indicators are not present but hydric soils and wetland hydrology are observed.

Soils

Hydric soils are indicative of wetlands. Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile (Federal Register, 1994). The Natural Resources Conservation Service (NRCS), in cooperation with the National Technical Committee for Hydric Soils, has compiled lists of hydric soils (NRCS, 1995). These lists identify soil series mapped by the NRCS that meet hydric soil criteria. It is common, however, for a map unit of non-wetland (non-hydric) soil to have inclusions of hydric soil, and vice versa. Therefore, field examination of soil conditions is important to determine if hydric soil conditions exist.

The NRCS has developed a guide for identifying field indicators of hydric soils (NRCS, 2010). This list of hydric soil indicators is considered to be dynamic; revisions are anticipated to occur on a regular basis as a result of ongoing studies of hydric soils. In general, anaerobic conditions create certain characteristics in hydric soils, collectively known as “redoximorphic features,” that can be observed in the field (Vepraskas, 1999). Redoximorphic features include high organic content, accumulation of sulfidic material (rotten egg odor), greenish- or bluish-gray color (gley formation), spots or blotches of different

color interspersed with the dominant or matrix color (mottling), and dark soil colors (low soil chroma) (NRCS, 2010; Vepraskas, 1999). Soil colors are described both by common color name (for example, “dark brown”) and by a numerical description of their hue, value, and chroma (for example, 10YR 2/2) as identified on a Munsell soil color chart (Munsell Color, 2000). Soil color is determined from a moist soil sample.

The Regional Supplement provides methods for difficult situations where hydric soil indicators are not observed, but indicators of hydrophytic vegetation and wetland hydrology are present.

Hydrology

Water must be present in order for wetlands to exist; however, it need not be present throughout the entire year. Wetland hydrology is considered to be present when there is permanent or periodic inundation or soil saturation at or near the soil surface for more than 12.5% of the growing season (typically two weeks in lowland Pacific Northwest areas). Areas that are inundated or saturated for between 5% and 12.5% of the growing season in most years may or may not be wetlands. Areas inundated or saturated for less than 5% of the growing season are non-wetlands (Ecology, 1997).

Indicators of wetland hydrology include observation of ponding or soil saturation, water marks, drift lines, drainage patterns, sediment deposits, oxidized rhizospheres, water-stained leaves, and local soil survey data. Where positive indicators of wetland hydrology are observed, it is assumed that wetland hydrology occurs for a sufficient period of the growing season to meet the wetland criteria, as described by Ecology (1997). The Regional Supplement provides methods for evaluating situations in wetlands that periodically lack indicators of wetland hydrology but where hydric soils and hydrophytic vegetation are present.

CLASSIFYING WETLANDS

Two classification systems are commonly used to describe wetlands. The hydrogeomorphic (HGM) system describes wetlands in terms of their position in the landscape and the movement of water in the wetland (Brinson, 1993). The U.S. Fish and Wildlife Service classification system (Cowardin et al., 1979) describes wetlands in terms of their vegetation communities; these include, for example, emergent, scrub-shrub, and forested community types.

ASSESSING WETLAND FUNCTIONS

The City of Issaquah specifies the use of Ecology’s *Washington State Wetland Rating System for Western Washington—2014 Update* (Hruby, 2014) for rating wetlands. This rating system was developed by Ecology to differentiate wetlands based on their sensitivity to disturbance, their significance, their rarity, our ability to replace them, and the beneficial functions they provide to society. Although this system is designed to rate wetlands, it is based on whether a particular wetland performs a particular function and the relative level to which the function is performed. An assessment of wetland functions is inherent in the rating system. Appendix C provides additional information about the rating system wetland categories and completed rating forms for the project.

The rating system was designed to differentiate between wetlands based on their sensitivity to disturbance, their significance, their rarity, our ability to replace them, and the functions they provide. In addition to rating a particular wetland, the rating system also provides a qualitative assessment of several wetland functions, including water quality improvement, flood flow alteration, and wildlife habitat. Wetlands are given points based on a series of questions regarding water quality, hydrologic, and habitat functions, and then scored into four categories: Category I (highest score) through Category IV (lowest score). Because detailed scientific knowledge of wetland functions is limited, evaluations of the functions of individual wetlands are somewhat qualitative and dependent upon professional judgment.

IDENTIFYING STREAMS

ESA marked the locations of the ordinary high water (OHWM) of streams in the study area with blue and white striped flagging. For purposes of determining its lateral jurisdiction under the Clean Water Act (33 CFR 328.3(e)), the U.S. Army Corps of Engineers defines the OHWM as: "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas" (Corps, 2005). Other physical characteristics that should be used to determine the OHWM include wracking; vegetation matted down, bent, or absent; sediment sorting; leaf litter disturbed or washed away; scour; deposition; multiple observed flow events; bed and banks; water staining; and a change in plant community (Corps, 2005).

Based on the definition in IMC 18.10.390, streams were flagged along the ordinary high water mark (OHWM) with blue and white striped flagging.

Appendix B

Wetland Determination Data Sheets

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: SPAR Pump Station City/County: Issaquah/King Sampling Date: 5/3/2017
 Applicant/Owner: Issaquah/WSDOT State: WA Sampling Point: DP 3-1
 Investigator(s): Scott Olmsted Section, Township, Range: S27 T24 R6
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 2
 Subregion (LRR): A Lat: 47.533970 Long: -122.027061 Datum: NAD83
 Soil Map Unit Name: Alderwood and Kitsap soils, very steep NWI Classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in Remarks.)
 Are Vegetation ☐ , Soil ☐ , or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? ☒ Yes ☐ No
 Are Vegetation ☐ , Soil ☐ , or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No Hydric Soil Present? <input checked="" type="radio"/> Yes <input type="radio"/> No Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	Is the Sampled Area within a Wetland? <input checked="" type="radio"/> Yes <input type="radio"/> No
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>10m</u>)	Absolute % Cover	Dom. Sp.?	Relative % Cover	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)																								
1. <u>Alnus rubra</u>	<u>40</u>	<u>Y</u>	<u>100.0</u>	<u>FAC</u>																									
2. _____	_____	_____	_____	_____																									
3. _____	_____	_____	_____	_____																									
4. _____	_____	_____	_____	_____																									
<u>40</u> = Total Cover					Prevalence Index worksheet: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Total % Cover of:</th> <th style="width: 10%;">Multiply by:</th> <th style="width: 50%;"></th> </tr> </thead> <tbody> <tr> <td>OBL species</td> <td><u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species</td> <td><u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species</td> <td><u>128</u></td> <td>x 3 = <u>384</u></td> </tr> <tr> <td>FACU species</td> <td><u>13</u></td> <td>x 4 = <u>52</u></td> </tr> <tr> <td>UPL species</td> <td><u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals:</td> <td><u>141</u> (A)</td> <td><u>436</u> (B)</td> </tr> <tr> <td colspan="3" style="text-align: center;">Prevalence Index = B/A = <u>3.092</u></td> </tr> </tbody> </table>	Total % Cover of:	Multiply by:		OBL species	<u>0</u>	x 1 = <u>0</u>	FACW species	<u>0</u>	x 2 = <u>0</u>	FAC species	<u>128</u>	x 3 = <u>384</u>	FACU species	<u>13</u>	x 4 = <u>52</u>	UPL species	<u>0</u>	x 5 = <u>0</u>	Column Totals:	<u>141</u> (A)	<u>436</u> (B)	Prevalence Index = B/A = <u>3.092</u>		
Total % Cover of:	Multiply by:																												
OBL species	<u>0</u>	x 1 = <u>0</u>																											
FACW species	<u>0</u>	x 2 = <u>0</u>																											
FAC species	<u>128</u>	x 3 = <u>384</u>																											
FACU species	<u>13</u>	x 4 = <u>52</u>																											
UPL species	<u>0</u>	x 5 = <u>0</u>																											
Column Totals:	<u>141</u> (A)	<u>436</u> (B)																											
Prevalence Index = B/A = <u>3.092</u>																													
Sapling/Shrub Stratum (Plot size: <u>5m</u>)																													
1. <u>Rubus spectabilis</u>	<u>50</u>	<u>Y</u>	<u>83.3</u>	<u>FAC</u>	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																								
2. <u>Oemleria cerasiformis</u>	<u>10</u>	<u>N</u>	<u>16.7</u>	<u>FACU</u>																									
3. _____	_____	_____	_____	_____	Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No																								
4. _____	_____	_____	_____	_____																									
5. _____	_____	_____	_____	_____	Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No																								
<u>60</u> = Total Cover																													
Herb Stratum (Plot size: <u>1m</u>)																													
1. <u>Athyrium filix-femina</u>	<u>35</u>	<u>Y</u>	<u>85.4</u>	<u>FAC</u>	Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No																								
2. <u>Polystichum munitum</u>	<u>3</u>	<u>N</u>	<u>7.3</u>	<u>FACU</u>																									
3. <u>Blechnum spicant</u>	<u>3</u>	<u>N</u>	<u>7.3</u>	<u>FAC</u>	Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No																								
4. _____	_____	_____	_____	_____																									
5. _____	_____	_____	_____	_____	Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No																								
6. _____	_____	_____	_____	_____																									
7. _____	_____	_____	_____	_____	Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No																								
8. _____	_____	_____	_____	_____																									
9. _____	_____	_____	_____	_____	Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No																								
10. _____	_____	_____	_____	_____																									
11. _____	_____	_____	_____	_____	Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No																								
<u>41</u> = Total Cover																													
Woody Vine Stratum (Plot size: _____)																													
1. _____	_____	_____	_____	_____	Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No																								
2. _____	_____	_____	_____	_____																									
_____ = Total Cover					Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No																								
% Bare Ground in Herb Stratum _____																													
Remarks:																													

SOIL

Sampling Point: DP 3-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)									
Depth (inches)	Matrix		Redox Features				Texture	Remarks	
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²			
0-3	10YR	3/2	100					loamy silt	
3-9	2.5Y	4/1	95	2.5Y	5/6	5	C	M	sandy loam
9-16	5Y	4/3	97	10YR	3/6		C	M	sandy loam

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input checked="" type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> Sandy Gleyed Matrix (S4)	Indicators for Problematic Hydric Soils³: <input type="checkbox"/> 2 cm Muck (A10) <input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
Restrictive Layer (if present): Type: _____ Depth (inches): _____	
Remarks: _____	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one required; check all that apply)				Secondary Indicators (2 or more required)	
<input type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) <input type="checkbox"/> Salt Crust (B11) <input type="checkbox"/> Aquatic Invertebrates (B13) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Raised Ant Mounds (D6) (LRR A) <input type="checkbox"/> Frost-Heave Hummocks (D7)			
Field Observations: Surface Water Present? <input type="radio"/> Yes <input checked="" type="radio"/> No Depth (inches): _____ Water Table Present? <input checked="" type="radio"/> Yes <input type="radio"/> No Depth (inches): 10 Saturation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No Depth (inches): surface		Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No			
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: _____					
Remarks: _____					

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: SPAR Pump Station City/County: Issaquah/King Sampling Date: 5/3/2017
 Applicant/Owner: Issaquah/WSDOT State: WA Sampling Point: DP 3-2
 Investigator(s): Scott Olmsted Section, Township, Range: S27 T24 R6
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 5
 Subregion (LRR): A Lat: 47.533970 Long: -122.026950 Datum: NAD83
 Soil Map Unit Name: Alderwood and Kitsap soils, very steep NWI Classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in Remarks.)
 Are Vegetation ☐ , Soil ☐ , or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? ☒ Yes ☐ No
 Are Vegetation ☐ , Soil ☐ , or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No Hydric Soil Present? <input type="radio"/> Yes <input checked="" type="radio"/> No Wetland Hydrology Present? <input type="radio"/> Yes <input checked="" type="radio"/> No	Is the Sampled Area within a Wetland? <input type="radio"/> Yes <input checked="" type="radio"/> No
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>1m</u>)	Absolute % Cover	Dom. Sp.?	Relative % Cover	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>66.7%</u> (A/B)																								
1. <u><i>Alnus rubra</i></u>	<u>80</u>	<u>Y</u>	<u>88.9</u>	<u>FAC</u>																									
2. <u><i>Pseudotsuga menziesii</i></u>	<u>10</u>	<u>N</u>	<u>11.1</u>	<u>FACU</u>																									
3. _____	_____	_____	_____	_____																									
4. _____	_____	_____	_____	_____																									
	<u>90</u>	<u>= Total Cover</u>																											
Sapling/Shrub Stratum (Plot size: <u>1m</u>)																													
1. <u><i>Rubus armeniacus</i></u>	<u>50</u>	<u>Y</u>	<u>82.0</u>	<u>FAC</u>	Prevalence Index worksheet: <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 40%;">Total % Cover of:</th> <th style="width: 20%;">Multiply by:</th> <th style="width: 40%;"></th> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 =</td> <td><u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 =</td> <td><u>0</u></td> </tr> <tr> <td>FAC species <u>130</u></td> <td>x 3 =</td> <td><u>390</u></td> </tr> <tr> <td>FACU species <u>20</u></td> <td>x 4 =</td> <td><u>80</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 =</td> <td><u>0</u></td> </tr> <tr> <td>Column Totals: <u>150</u> (A)</td> <td></td> <td><u>470</u> (B)</td> </tr> <tr> <td colspan="3" style="text-align: center;">Prevalence Index = B/A = <u>3.133</u></td> </tr> </table>	Total % Cover of:	Multiply by:		OBL species <u>0</u>	x 1 =	<u>0</u>	FACW species <u>0</u>	x 2 =	<u>0</u>	FAC species <u>130</u>	x 3 =	<u>390</u>	FACU species <u>20</u>	x 4 =	<u>80</u>	UPL species <u>0</u>	x 5 =	<u>0</u>	Column Totals: <u>150</u> (A)		<u>470</u> (B)	Prevalence Index = B/A = <u>3.133</u>		
Total % Cover of:	Multiply by:																												
OBL species <u>0</u>	x 1 =	<u>0</u>																											
FACW species <u>0</u>	x 2 =	<u>0</u>																											
FAC species <u>130</u>	x 3 =	<u>390</u>																											
FACU species <u>20</u>	x 4 =	<u>80</u>																											
UPL species <u>0</u>	x 5 =	<u>0</u>																											
Column Totals: <u>150</u> (A)		<u>470</u> (B)																											
Prevalence Index = B/A = <u>3.133</u>																													
2. <u><i>Ilex aquifolium</i></u>	<u>10</u>	<u>N</u>	<u>16.4</u>	<u>FACU</u>																									
3. <u><i>Hetera helix</i></u>	<u>1</u>	<u>N</u>	<u>1.6</u>	<u>#N/A</u>																									
4. _____	_____	_____	_____	_____																									
5. _____	_____	_____	_____	_____																									
	<u>61</u>	<u>= Total Cover</u>																											
Herb Stratum (Plot size: <u>1m</u>)																													
1. <u><i>Polystichum munitum</i></u>	<u>25</u>	<u>Y</u>	<u>100.0</u>		Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																								
2. _____	_____	_____	_____	_____																									
3. _____	_____	_____	_____	_____																									
4. _____	_____	_____	_____	_____																									
5. _____	_____	_____	_____	_____																									
6. _____	_____	_____	_____	_____																									
7. _____	_____	_____	_____	_____																									
8. _____	_____	_____	_____	_____																									
9. _____	_____	_____	_____	_____																									
10. _____	_____	_____	_____	_____																									
11. _____	_____	_____	_____	_____																									
	<u>25</u>	<u>= Total Cover</u>																											
Woody Vine Stratum (Plot size: _____)																													
1. _____	_____	_____	_____	_____	Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No																								
2. _____	_____	_____	_____	_____																									
	_____	<u>= Total Cover</u>																											
% Bare Ground in Herb Stratum _____																													
Remarks:																													

SOIL

Sampling Point: DP 3-2

[illegible]

HYDROLOGY

Wetland Hydrology Indicators:		
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		
Field Observations:		
Surface Water Present? <input type="radio"/> Yes <input checked="" type="radio"/> No Water Table Present? <input type="radio"/> Yes <input checked="" type="radio"/> No Saturation Present? <input type="radio"/> Yes <input checked="" type="radio"/> No (includes capillary fringe)	Depth (inches): _____ Depth (inches): _____ Depth (inches): _____	Wetland Hydrology Present? <input type="radio"/> Yes <input checked="" type="radio"/> No
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Top few inches were saturated due to precipitation. Moist, not saturated below.		

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: SPAR Pump Station City/County: Issaquah/King Sampling Date: 5/3/2017
 Applicant/Owner: Issaquah/WSDOT State: WA Sampling Point: DP 4A-1
 Investigator(s): Scott Olmsted Section, Township, Range: S27 T24 R6
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 10
 Subregion (LRR): A Lat: 47.533229 Long: -122.026283 Datum: _____
 Soil Map Unit Name: Alderwood and Kitsap soils, very steep NWI Classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in Remarks.)
 Are Vegetation ☐ , Soil ☐ , or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? ☒ Yes ☐ No
 Are Vegetation ☐ , Soil ☐ , or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? <input type="radio"/> Yes <input checked="" type="radio"/> No Hydric Soil Present? <input type="radio"/> Yes <input checked="" type="radio"/> No Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	Is the Sampled Area within a Wetland? <input type="radio"/> Yes <input checked="" type="radio"/> No
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 1m)	Absolute % Cover	Dom. Sp.?	Relative % Cover	Indicator Status																																										
1. <u><i>Alnus rubra</i></u>	3	N	6.4	FAC		Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>25.0%</u> (A/B)																																								
2. <u><i>Pseudotsuga menziesii</i></u>	40	Y	85.1	FACU																																										
3. <u><i>Thuja plicata</i></u>	1	N	2.1	FAC																																										
4. <u><i>Arbutus menziesii</i></u>	3	N	6.4	UPL																																										
	47	= Total Cover				Prevalence Index worksheet: <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 40%;">Total % Cover of:</th> <th style="width: 10%;"></th> <th style="width: 10%;">Multiply by:</th> <th style="width: 10%;"></th> <th style="width: 10%;"></th> </tr> <tr> <td>OBL species</td> <td>0</td> <td>x 1 =</td> <td>0</td> <td></td> </tr> <tr> <td>FACW species</td> <td>0</td> <td>x 2 =</td> <td>0</td> <td></td> </tr> <tr> <td>FAC species</td> <td>11</td> <td>x 3 =</td> <td>33</td> <td></td> </tr> <tr> <td>FACU species</td> <td>66</td> <td>x 4 =</td> <td>264</td> <td></td> </tr> <tr> <td>UPL species</td> <td>3</td> <td>x 5 =</td> <td>15</td> <td></td> </tr> <tr> <td>Column Totals:</td> <td>80</td> <td>(A)</td> <td>312</td> <td>(B)</td> </tr> <tr> <td colspan="5">Prevalence Index = B/A = <u>3.900</u></td> </tr> </table>	Total % Cover of:		Multiply by:			OBL species	0	x 1 =	0		FACW species	0	x 2 =	0		FAC species	11	x 3 =	33		FACU species	66	x 4 =	264		UPL species	3	x 5 =	15		Column Totals:	80	(A)	312	(B)	Prevalence Index = B/A = <u>3.900</u>				
Total % Cover of:		Multiply by:																																												
OBL species	0	x 1 =	0																																											
FACW species	0	x 2 =	0																																											
FAC species	11	x 3 =	33																																											
FACU species	66	x 4 =	264																																											
UPL species	3	x 5 =	15																																											
Column Totals:	80	(A)	312	(B)																																										
Prevalence Index = B/A = <u>3.900</u>																																														
Sapling/Shrub Stratum (Plot size: 1m)																																														
1. <u><i>Rubus armeniacus</i></u>	2	N	5.3	FAC																																										
2. <u><i>Ilex aquifolium</i></u>	5	N	13.2	FACU																																										
3. <u><i>Hetera helix</i></u>	30	Y	78.9	#N/A																																										
4. <u><i>Corylus cornuta</i></u>	1	N	2.6	FACU																																										
	38	= Total Cover																																												
Herb Stratum (Plot size: 1m)																																														
1. <u><i>Agrostis sp.</i></u>	5	Y	20.0	FAC	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0¹ <input type="checkbox"/> 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation¹ (Explain) ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																																									
2. <u><i>Hypochaeris radicata</i></u>	20	Y	80.0	FACU																																										
3. _____																																														
4. _____																																														
5. _____																																														
6. _____																																														
7. _____																																														
8. _____																																														
9. _____																																														
10. _____																																														
11. _____																																														
	25	= Total Cover																																												
Woody Vine Stratum (Plot size: _____)																																														
1. _____					Hydrophytic Vegetation Present? <input type="radio"/> Yes <input checked="" type="radio"/> No																																									
2. _____																																														
		= Total Cover																																												
% Bare Ground in Herb Stratum _____																																														
Remarks:																																														

SOIL

Sampling Point: DP 4A-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)									
Depth (inches)	Matrix		Redox Features				Texture	Remarks	
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²			
0-4	10YR	3/2	100				Loam		
4-10	10YR	4/4	100				Loam	gravelly	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> Sandy Gleyed Matrix (S4)	Indicators for Problematic Hydric Soils³: <input type="checkbox"/> 2 cm Muck (A10) <input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
--	--

Restrictive Layer (if present): Type: <u>gravel</u> Depth (inches): <u>10</u>	Hydric Soil Present? <input type="radio"/> Yes <input checked="" type="radio"/> No
Remarks: Soil was all fill material.	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one required; check all that apply)				Secondary Indicators (2 or more required)			
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> FAC-Neutral Test (D5)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Other (Explain in Remarks)		<input type="checkbox"/> Frost-Heave Hummocks (D7)			
<input type="checkbox"/> Water Marks (B1)							
<input type="checkbox"/> Sediment Deposits (B2)							
<input type="checkbox"/> Drift Deposits (B3)							
<input type="checkbox"/> Algal Mat or Crust (B4)							
<input type="checkbox"/> Iron Deposits (B5)							
<input type="checkbox"/> Surface Soil Cracks (B6)							
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)							
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)							

Field Observations: Surface Water Present? <input type="radio"/> Yes <input checked="" type="radio"/> No Depth (inches): _____ Water Table Present? <input checked="" type="radio"/> Yes <input type="radio"/> No Depth (inches): <u>9</u> Saturation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No Depth (inches): <u>4</u> (includes capillary fringe)	Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: Top few inches were saturated due to precipitation. Moist, not saturated below.	

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: SPAR Pump Station City/County: Issaquah/King Sampling Date: 5/3/2017
 Applicant/Owner: Issaquah/WSDOT State: WA Sampling Point: DP 4A-2
 Investigator(s): Scott Olmsted Section, Township, Range: S27 T24 R6
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 3
 Subregion (LRR): A Lat: 47.533229 Long: -122.026283 Datum: _____
 Soil Map Unit Name: Alderwood and Kitsap soils, very steep NWI Classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in Remarks.)
 Are Vegetation ☐ , Soil ☐ , or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? ☒ Yes ☐ No
 Are Vegetation ☐ , Soil ☐ , or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No Hydric Soil Present? <input checked="" type="radio"/> Yes <input type="radio"/> No Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	Is the Sampled Area within a Wetland? <input checked="" type="radio"/> Yes <input type="radio"/> No
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>1m</u>)	Absolute % Cover	Dom. Sp.?	Relative % Cover	Indicator Status																																	
1. <u>Alnus rubra</u>	40	Y	88.9	FAC	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)																																
2. <u>Tsuga Heterophylla</u>	2	N	4.4	FACU																																	
3. <u>Fraxinus latifolia</u>	3	N	6.7	FACW																																	
4. _____																																					
	45	= Total Cover																																			
Sapling/Shrub Stratum (Plot size: _____)																																					
1. <u>Rubus armeniacus</u>	2	Y	100.0	FAC	Prevalence Index worksheet: <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 40%;">Total % Cover of:</th> <th style="width: 20%;">Multiply by:</th> <th style="width: 20%;"></th> <th style="width: 20%;"></th> </tr> <tr> <td>OBL species</td> <td style="text-align: center;">0</td> <td>x 1 =</td> <td style="text-align: center;">0</td> </tr> <tr> <td>FACW species</td> <td style="text-align: center;">43</td> <td>x 2 =</td> <td style="text-align: center;">86</td> </tr> <tr> <td>FAC species</td> <td style="text-align: center;">45</td> <td>x 3 =</td> <td style="text-align: center;">135</td> </tr> <tr> <td>FACU species</td> <td style="text-align: center;">2</td> <td>x 4 =</td> <td style="text-align: center;">8</td> </tr> <tr> <td>UPL species</td> <td style="text-align: center;">0</td> <td>x 5 =</td> <td style="text-align: center;">0</td> </tr> <tr> <td>Column Totals:</td> <td style="text-align: center;">90</td> <td>(A)</td> <td style="text-align: center;">229</td> </tr> <tr> <td colspan="4"> Prevalence Index = B/A = <u>2.544</u> </td> </tr> </table>	Total % Cover of:	Multiply by:			OBL species	0	x 1 =	0	FACW species	43	x 2 =	86	FAC species	45	x 3 =	135	FACU species	2	x 4 =	8	UPL species	0	x 5 =	0	Column Totals:	90	(A)	229	Prevalence Index = B/A = <u>2.544</u>			
Total % Cover of:	Multiply by:																																				
OBL species	0	x 1 =	0																																		
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FAC species	45	x 3 =	135																																		
FACU species	2	x 4 =	8																																		
UPL species	0	x 5 =	0																																		
Column Totals:	90	(A)	229																																		
Prevalence Index = B/A = <u>2.544</u>																																					
2. _____																																					
3. _____																																					
4. _____																																					
5. _____																																					
	2	= Total Cover																																			
Herb Stratum (Plot size: <u>1m</u>)																																					
1. <u>Poa sp.</u>	3	N	7.0	FAC	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input checked="" type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																																
2. <u>Juncus effusus</u>	40	Y	93.0	FACW																																	
3. _____																																					
4. _____																																					
5. _____																																					
6. _____																																					
7. _____																																					
8. _____																																					
9. _____																																					
10. _____																																					
11. _____																																					
	43	= Total Cover																																			
Woody Vine Stratum (Plot size: _____)																																					
1. _____					Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No																																
2. _____																																					
		= Total Cover																																			
% Bare Ground in Herb Stratum _____																																					
Remarks:																																					

SOIL

Sampling Point: DP 4A-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)									
Depth (inches)	Matrix		Redox Features				Texture	Remarks	
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²			
0-3	10YR	3/2	100					Sandy Loam	
3-12	7.5YR	5/1	90	10YR	5/8	10	C	M	Silt Loam

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input checked="" type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input checked="" type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8)	Indicators for Problematic Hydric Soils³: <input type="checkbox"/> 2 cm Muck (A10) <input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
---	--

Restrictive Layer (if present): Type: <u>rock</u> Depth (inches): <u>12</u>	Hydric Soil Present? <input checked="" type="radio"/> Yes <input type="radio"/> No
Remarks: Soil was all fill material.	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one required; check all that apply)				Secondary Indicators (2 or more required)			
<input type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) <input type="checkbox"/> Salt Crust (B11) <input type="checkbox"/> Aquatic Invertebrates (B13) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Raised Ant Mounds (D6) (LRR A) <input type="checkbox"/> Frost-Heave Hummocks (D7)					
Field Observations: Surface Water Present? <input type="radio"/> Yes <input checked="" type="radio"/> No Depth (inches): _____ Water Table Present? <input checked="" type="radio"/> Yes <input type="radio"/> No Depth (inches): <u>9</u> Saturation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No Depth (inches): <u>4</u> (includes capillary fringe)				Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No			
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:							
Remarks: Top few inches were saturated due to precipitation. Moist, not saturated below.							

Appendix C

Ecology Rating Forms

Washington State Wetland Rating System

The observed wetlands were rated using the *Washington State Wetland Rating System for Western Washington—2014 Update* (Hruby, 2014). Each of these systems were developed by Ecology to differentiate wetlands based on their sensitivity to disturbance, their significance, their rarity, our ability to replace them, and the beneficial functions they provide to society. Wetlands are categorized using the Ecology rating system according to the following criteria:

Category I wetlands represent a unique or rare wetland type; or are more sensitive to disturbance; or are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime.

Category II wetlands are difficult, though not impossible, to replace, and provide high levels of some functions.

Category III wetlands have a moderate level of function. They have been disturbed in some ways, and are often less diverse or more isolated from other natural resources in the landscape than Category II wetlands.

Category IV wetlands have the lowest levels of functions and are often heavily disturbed.

Wetland name or number A

RATING SUMMARY – Western Washington

Name of wetland (or ID #): A Date of site visit: 050317
Rated by Scott Eustice Trained by Ecology? Yes ☒ No Date of training _____
HGM Class used for rating SLP Wetland has multiple HGM classes? Y ☒ N

NOTE: Form is not complete without the figures requested (figures can be combined).
Source of base aerial photo/map _____

OVERALL WETLAND CATEGORY IV (based on functions _____ or special characteristics _____)

1. Category of wetland based on FUNCTIONS

- _____ Category I – Total score = 23 - 27
_____ Category II – Total score = 20 - 22
_____ Category III – Total score = 16 - 19
☒ Category IV – Total score = 9 - 15

40'
No Buffer

FUNCTION	Improving Water Quality			Hydrologic			Habitat			
Circle the appropriate ratings										
Site Potential	H	M	L	H	M	L	H	M	L	
Landscape Potential	H	M	L	H	M	L	H	M	L	
Value	H	M	L	H	M	L	H	M	L	
Score Based on Ratings	5			5			5			15

Score for each function based on three ratings (order of ratings is not important)

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	<input checked="" type="checkbox"/>

Wetland name or number A

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (<i>can be added to map of hydroperiods</i>)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (<i>can be added to another figure</i>)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	A.1
Hydroperiods	H 1.2	A.2
Plant cover of dense trees, shrubs, and herbaceous plants	S 1.3	A.3
Plant cover of dense, rigid trees, shrubs, and herbaceous plants (<i>can be added to figure above</i>)	S 4.1	A.3
Boundary of 150 ft buffer (<i>can be added to another figure</i>)	S 2.1, S 5.1	A.4
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	A.5
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	A.6
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	A.7

Wetland name or number A

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO - go to 2

YES - the wetland class is **Tidal Fringe** - go to 1.1

- 1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO - Saltwater Tidal Fringe (Estuarine)

YES - Freshwater Tidal Fringe

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO - go to 3

YES - The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

- ___ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
___ At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO - go to 4

YES - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

- ___ The wetland is on a slope (*slope can be very gradual*),
___ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
___ The water leaves the wetland **without being impounded**.

NO - go to 5

YES - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

- ___ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
___ The overbank flooding occurs at least once every 2 years.

Wetland name or number A

NO - go to 6

YES - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO - go to 7

YES - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO - go to 8

YES - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number A

SLOPE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

S 1.0. Does the site have the potential to improve water quality?		
S 1.1. Characteristics of the average slope of the wetland: (a 1% slope has a 1 ft vertical drop in elevation for every 100 ft of horizontal distance) Slope is 1% or less points = 3 Slope is > 1%-2% points = 2 Slope is > 2%-5% <u>points = 1</u> Slope is greater than 5% points = 0		1
S 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (use NRCS definitions): Yes = 3 <u>No = 0</u>		<u>0</u>
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. <i>Dense means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 in.</i> Dense, uncut, herbaceous plants > 90% of the wetland area points = 6 Dense, uncut, herbaceous plants > ½ of area points = 3 Dense, woody, plants > ½ of area points = 2 Dense, uncut, herbaceous plants > ¼ of area <u>points = 1</u> Does not meet any of the criteria above for plants points = 0		1
Total for S 1 Add the points in the boxes above		<u>2</u>

Rating of Site Potential If score is: 12 = H 6-11 = M X 0-5 = L

Record the rating on the first page

S 2.0. Does the landscape have the potential to support the water quality function of the site?	
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? Yes = 1 <u>No = 0</u>	<u>0</u>
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources _____ Yes = 1 <u>No = 0</u>	<u>0</u>
Total for S 2 Add the points in the boxes above	<u>0</u>

Rating of Landscape Potential If score is: 1-2 = M X 0 = L

Record the rating on the first page

S 3.0. Is the water quality improvement provided by the site valuable to society?	
S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? <u>Yes = 1</u> No = 0	1
S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? At least one aquatic resource in the basin is on the 303(d) list. <u>Yes = 1</u> No = 0	1
S 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? Answer YES if there is a TMDL for the basin in which unit is found. <u>Yes = 2</u> No = 0	2
Total for S 3 Add the points in the boxes above	<u>4</u>

Rating of Value If score is: X 2-4 = H 1 = M 0 = L

Record the rating on the first page

Wetland name or number A

SLOPE WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream erosion

S 4.0. Does the site have the potential to reduce flooding and stream erosion?

S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually $> 1/8$ in), or dense enough, to remain erect during surface flows.*

Dense, uncut, **rigid** plants cover $> 90\%$ of the area of the wetland

points = 1

All other conditions

points = 0

0

Rating of Site Potential If score is: 1 = M X 0 = L

Record the rating on the first page

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?

S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff?

Yes = 1 No = 0

0

Rating of Landscape Potential If score is: 1 = M X 0 = L

Record the rating on the first page

S 6.0. Are the hydrologic functions provided by the site valuable to society?

S 6.1. Distance to the nearest areas downstream that have flooding problems:

The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds)

points = 2

Surface flooding problems are in a sub-basin farther down-gradient

points = 1

No flooding problems anywhere downstream

points = 0

2

S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?

Yes = 2 No = 0

0

Total for S 6

Add the points in the boxes above

2

Rating of Value If score is: X 2-4 = H 1 = M 0 = L

Record the rating on the first page

NOTES and FIELD OBSERVATIONS:

Wetland name or number A

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- | | |
|---|----------------------------------|
| <input type="checkbox"/> Aquatic bed | 4 structures or more: points = 4 |
| <input checked="" type="checkbox"/> Emergent | 3 structures: points = 2 |
| <input checked="" type="checkbox"/> Scrub-shrub (areas where shrubs have > 30% cover) | 2 structures: <u>points = 1</u> |
| <input type="checkbox"/> Forested (areas where trees have > 30% cover) | 1 structure: points = 0 |
- If the unit has a Forested class, check if:*
- ☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- | | |
|---|-------------------------------------|
| <input type="checkbox"/> Permanently flooded or inundated | 4 or more types present: points = 3 |
| <input checked="" type="checkbox"/> Seasonally flooded or inundated | 3 types present: <u>points = 2</u> |
| <input type="checkbox"/> Occasionally flooded or inundated | 2 types present: points = 1 |
| <input checked="" type="checkbox"/> Saturated only | 1 type present: points = 0 |
- ☐ Permanently flowing stream or river in, or adjacent to, the wetland
- ☒ Seasonally flowing stream in, or adjacent to, the wetland
- ☐ Lake Fringe wetland 2 points
- ☐ Freshwater tidal wetland 2 points

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft².

Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle

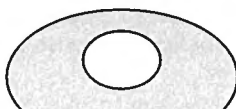
- If you counted: > 19 species points = 2
- 5 - 19 species points = 1
- < 5 species points = 0

H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersions among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points



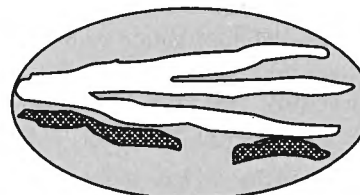
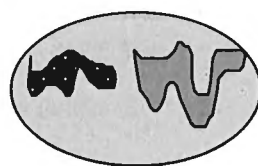
Low = 1 point



Moderate = 2 points



All three diagrams in this row are **HIGH** = 3points



Wetland name or number A

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. <i>The number of checks is the number of points.</i> <input type="checkbox"/> Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). <input type="checkbox"/> Standing snags (dbh > 4 in) within the wetland <input type="checkbox"/> Undercut banks are present for at least 6.6 ft (2 m) and/or overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) <input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet weathered where wood is exposed</i>) <input type="checkbox"/> At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>) <input checked="" type="checkbox"/> Invasive plants cover less than 25% of the wetland area in every stratum of plants (<i>see H 1.1 for list of strata</i>)		1
Total for H 1	Add the points in the boxes above	6

Rating of Site Potential If score is: 15-18 = H 7-14 = M X 0-6 = L Record the rating on the first page

H 2.0. Does the landscape have the potential to support the habitat functions of the site?		
H 2.1. Accessible habitat (include only habitat that directly abuts wetland unit). Calculate: \emptyset % undisturbed habitat $\emptyset + [(\% \text{ moderate and low intensity land uses}) / 2] 7.5 = 7.5$ % If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1 km Polygon points = 2 10-19% of 1 km Polygon points = 1 < 10% of 1 km Polygon <u>points = 0</u> (trails)		0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. Calculate: \emptyset % undisturbed habitat $\emptyset + [(\% \text{ moderate and low intensity land uses}) / 2] 17.5 = 17.5$ % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10-50% and in 1-3 patches points = 2 Undisturbed habitat 10-50% and > 3 patches <u>points = 1</u> (trails) Undisturbed habitat < 10% of 1 km Polygon points = 0		1
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1 km Polygon is high intensity points = 0		-2
Total for H 2	Add the points in the boxes above	-1

Rating of Landscape Potential If score is: 4-6 = H 1-3 = M X < 1 = L Record the rating on the first page

H 3.0. Is the habitat provided by the site valuable to society?		
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? Choose only the highest score that applies to the wetland being rated. Site meets ANY of the following criteria: points = 2 <input checked="" type="checkbox"/> It has 3 or more priority habitats within 100 m (see next page) <input type="checkbox"/> It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) <input type="checkbox"/> It is mapped as a location for an individual WDFW priority species <input type="checkbox"/> It is a Wetland of High Conservation Value as determined by the Department of Natural Resources <input type="checkbox"/> It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1 Site does not meet any of the criteria above points = 0		2

Rating of Value If score is: X 2 = H 1 = M 0 = L Record the rating on the first page

Wetland name or number A

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf> or access the list from here: <http://wdfw.wa.gov/conservation/phs/list/>)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: **NOTE:** *This question is independent of the land use between the wetland unit and the priority habitat.*

- **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ha (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ✓ **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- ✓ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ✓ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number A

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt <div style="text-align: right; margin-top: 10px;"> Yes – Go to SC 1.1 <u>No = Not an estuarine wetland</u> </div>	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? <div style="text-align: right;">Yes = Category I No - Go to SC 1.2</div>	Cat. I
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are <i>Spartina</i> , see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. <div style="text-align: right; margin-top: 10px;">Yes = Category I No = Category II</div>	Cat. I Cat. II
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? <div style="text-align: right;">Yes – Go to SC 2.2 No – Go to SC 2.3</div> SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? <div style="text-align: right;">Yes = Category I <u>No = Not a WHCV</u></div> SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf <div style="text-align: right;">Yes – Contact WNHP/WDNR and go to SC 2.4 No = Not a WHCV</div> SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? <div style="text-align: right;">Yes = Category I No = Not a WHCV</div>	Cat. I
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? <i>Use the key below. If you answer YES you will still need to rate the wetland based on its functions.</i> SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? <div style="text-align: right;">Yes – Go to SC 3.3 No – Go to SC 3.2</div> SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? <div style="text-align: right;">Yes – Go to SC 3.3 <u>No = Is not a bog</u></div> SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? <div style="text-align: right;">Yes = Is a Category I bog No – Go to SC 3.4</div> NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? <div style="text-align: right;">Yes = Is a Category I bog No = Is not a bog</div>	Cat. I

Wetland name or number A

<p>SC 4.0. Forested Wetlands</p> <p>Does the wetland have at least <u>1 contiguous acre</u> of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? <i>If you answer YES you will still need to rate the wetland based on its functions.</i></p> <ul style="list-style-type: none"> — Old-growth forests (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — Mature forests (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). <p>Yes = Category I No = Not a forested wetland for this section</p>	<p>Cat. I</p>
<p>SC 5.0. Wetlands in Coastal Lagoons</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <ul style="list-style-type: none"> — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>) <p>Yes – Go to SC 5.1 No = Not a wetland in a coastal lagoon</p> <p>SC 5.1. Does the wetland meet all of the following three conditions?</p> <ul style="list-style-type: none"> — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland is larger than 1/10 ac (4350 ft²) <p>Yes = Category I No = Category II</p>	<p>Cat. I</p> <p>Cat. II</p>
<p>SC 6.0. Interdunal Wetlands</p> <p>Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? <i>If you answer yes you will still need to rate the wetland based on its habitat functions.</i></p> <p>In practical terms that means the following geographic areas:</p> <ul style="list-style-type: none"> — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 <p>Yes – Go to SC 6.1 No = not an interdunal wetland for rating</p> <p>SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = Category I No – Go to SC 6.2</p> <p>SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = Category II No – Go to SC 6.3</p> <p>SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = Category III No = Category IV</p>	<p>Cat I</p> <p>Cat. II</p> <p>Cat. III</p> <p>Cat. IV</p>
<p>Category of wetland based on Special Characteristics</p> <p>If you answered No for all types, enter "Not Applicable" on Summary Form</p>	<p>NA</p>

Wetland name or number A

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Figure A.1. Cowardin Classes

Teal = Wetland A; green = emergent; orange = scrub-shrub



Figure A.2. Hydroperiods

Teal = Wetland A; Solid blue = seasonally flooded or inundated; blue dotted = saturated only; blue lines = seasonally flowing stream



Figure A.3. Cover of dense and dense, rigid plants

Teal = Wetland A; green dotted = cover of dense plants; orange = cover of dense, rigid plants



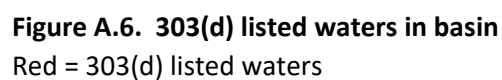
Figure A.4. 150-foot buffer

Green = Wetland A; yellow = 150-foot buffer



Figure A.5. Land uses within 1 km

Green = Wetland A; pink = 1 km buffer; blue = low-moderate intensity land uses; orange = accessible habitat



Wetland name or number B

RATING SUMMARY – Western Washington

Name of wetland (or ID #): B Date of site visit: 050317

Rated by SCOTT OUTSTED Trained by Ecology? Yes X No Date of training _____

HGM Class used for rating SWPE Wetland has multiple HGM classes? Y X N

NOTE: Form is not complete without the figures requested (figures can be combined).

Source of base aerial photo/map _____

OVERALL WETLAND CATEGORY III (based on functions _____ or special characteristics _____)

1. Category of wetland based on FUNCTIONS

_____ Category I – Total score = 23 - 27

_____ Category II – Total score = 20 - 22

X Category III – Total score = 16 - 19

_____ Category IV – Total score = 9 - 15

75'

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	H M <u>L</u>	H M <u>L</u>	H <u>M</u> L	
Landscape Potential	H M <u>L</u>	H M <u>L</u>	H M <u>L</u>	
Value	<u>H</u> M L	<u>H</u> M L	<u>H</u> M L	TOTAL
Score Based on Ratings	5	5	6	16

Score for each
function based
on three
ratings
(order of ratings
is not
important)

9 = H,H,H

8 = H,H,M

7 = H,H,L

7 = H,M,M

6 = H,M,L

6 = M,M,M

5 = H,L,L

5 = M,M,L

4 = M,L,L

3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	<u>X</u>

Wetland name or number B

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (<i>can be added to map of hydroperiods</i>)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (<i>can be added to another figure</i>)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	B.1
Hydroperiods	H 1.2	B.2
Plant cover of dense trees, shrubs, and herbaceous plants	S 1.3	B.3
Plant cover of dense, rigid trees, shrubs, and herbaceous plants (<i>can be added to figure above</i>)	S 4.1	B.3
Boundary of 150 ft buffer (<i>can be added to another figure</i>)	S 2.1, S 5.1	B.4
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	B.5
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	B.6
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	B.7

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO - go to 2

YES - the wetland class is **Tidal Fringe** - go to 1.1

- 1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO - Saltwater Tidal Fringe (Estuarine)

YES - Freshwater Tidal Fringe

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO - go to 3

YES - The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

- ___ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
___ At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO - go to 4

YES - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

- ___ The wetland is on a slope (*slope can be very gradual*),
___ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
___ The water leaves the wetland **without being impounded**.

NO - go to 5

YES - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

- ___ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
___ The overbank flooding occurs at least once every 2 years.

Wetland name or number B

NO - go to 6

YES - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO - go to 7

YES - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO - go to 8

YES - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number B

SLOPE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

S 1.0. Does the site have the potential to improve water quality?		
S 1.1. Characteristics of the average slope of the wetland: (a 1% slope has a 1 ft vertical drop in elevation for every 100 ft of horizontal distance) Slope is 1% or less points = 3 Slope is > 1%-2% <u>points = 2</u> Slope is > 2%-5% points = 1 Slope is greater than 5% points = 0		2
S 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (use NRCS definitions): Yes = 3 <u>No = 0</u>		0
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. <i>Dense means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 in.</i> Dense, uncut, herbaceous plants > 90% of the wetland area points = 6 Dense, uncut, herbaceous plants > ½ of area points = 3 Dense, woody, plants > ½ of area points = 2 Dense, uncut, herbaceous plants > ¼ of area <u>points = 1</u> Does not meet any of the criteria above for plants points = 0		1
Total for S 1 Add the points in the boxes above		3

Rating of Site Potential If score is: 12 = H 6-11 = M X 0-5 = L

Record the rating on the first page

S 2.0. Does the landscape have the potential to support the water quality function of the site?	
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? Yes = 1 <u>No = 0</u>	0
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources _____ Yes = 1 <u>No = 0</u>	0
Total for S 2 Add the points in the boxes above	0

Rating of Landscape Potential If score is: 1-2 = M X 0 = L

Record the rating on the first page

S 3.0. Is the water quality improvement provided by the site valuable to society?	
S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes <u>= 1</u> No = 0	1
S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? At least one aquatic resource in the basin is on the 303(d) list. Yes = <u>1</u> No = 0	1
S 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? Answer YES if there is a TMDL for the basin in which unit is found. Yes = 2 <u>No = 0</u>	0
Total for S 3 Add the points in the boxes above	2

Rating of Value If score is: X 2-4 = H 1 = M 0 = L

Record the rating on the first page

Wetland name or number B

SLOPE WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream erosion

S 4.0. Does the site have the potential to reduce flooding and stream erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. <i>Stems of plants should be thick enough (usually > 1/8 in), or dense enough, to remain erect during surface flows.</i> Dense, uncut, rigid plants cover > 90% of the area of the wetland All other conditions	points = 1 points = 0

0

Rating of Site Potential If score is: 1 = M ~~X 0~~ = L

Record the rating on the first page

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff?	Yes = 1 No = 0

0

Rating of Landscape Potential If score is: 1 = M ~~X 0~~ = L

Record the rating on the first page

S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems: The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) Surface flooding problems are in a sub-basin farther down-gradient No flooding problems anywhere downstream	points = 2 points = 1 points = 0
S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0
Total for S 6	Add the points in the boxes above <div style="font-size: 24px; text-align: center;">2</div>

2

0

2

Rating of Value If score is: ~~X 2-4~~ = H 1 = M 0 = L

Record the rating on the first page

NOTES and FIELD OBSERVATIONS:

Wetland name or number B

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- | | |
|---|----------------------------------|
| <input type="checkbox"/> Aquatic bed | 4 structures or more: points = 4 |
| <input checked="" type="checkbox"/> Emergent | 3 structures: points = 2 |
| <input checked="" type="checkbox"/> Scrub-shrub (areas where shrubs have > 30% cover) | 2 structures: points = <u>1</u> |
| <input type="checkbox"/> Forested (areas where trees have > 30% cover) | 1 structure: points = 0 |
- If the unit has a Forested class, check if:*
- ☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

1

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- | | |
|---|-------------------------------------|
| <input type="checkbox"/> Permanently flooded or inundated | 4 or more types present: points = 3 |
| <input checked="" type="checkbox"/> Seasonally flooded or inundated | 3 types present: points = <u>2</u> |
| <input type="checkbox"/> Occasionally flooded or inundated | 2 types present: points = 1 |
| <input checked="" type="checkbox"/> Saturated only | 1 type present: points = 0 |
- ☐ Permanently flowing stream or river in, or adjacent to, the wetland
- ☒ Seasonally flowing stream in, or adjacent to, the wetland
- ☐ Lake Fringe wetland 2 points
- ☐ Freshwater tidal wetland 2 points

2

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft².

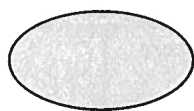
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle

- If you counted: > 19 species points = 2
- 5 - 19 species points = 1
- < 5 species points = 0

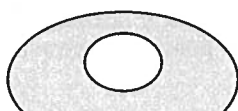
1

H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points



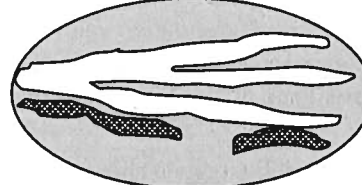
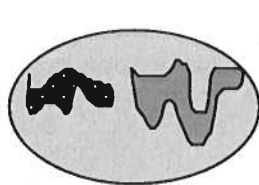
Low = 1 point



Moderate = 2 points



All three diagrams in this row are **HIGH** = 3points



1

Wetland name or number B

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. <i>The number of checks is the number of points.</i> <input checked="" type="checkbox"/> Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). <input checked="" type="checkbox"/> Standing snags (dbh > 4 in) within the wetland <input type="checkbox"/> Undercut banks are present for at least 6.6 ft (2 m) and/or overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) <input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet weathered where wood is exposed</i>) <input type="checkbox"/> At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>) <input checked="" type="checkbox"/> Invasive plants cover less than 25% of the wetland area in every stratum of plants (<i>see H 1.1 for list of strata</i>)		3
Total for H 1	Add the points in the boxes above	8

Rating of Site Potential If score is: 15-18 = H X 7-14 = M 0-6 = L Record the rating on the first page

H 2.0. Does the landscape have the potential to support the habitat functions of the site?		
H 2.1. Accessible habitat (include only habitat that directly abuts wetland unit). Calculate: % undisturbed habitat <u> </u> + [(% moderate and low intensity land uses)/2] <u>15</u> = <u>7.5</u> % If total accessible habitat is: <u>(trails)</u> > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1 km Polygon points = 2 10-19% of 1 km Polygon points = 1 < 10% of 1 km Polygon points = 0		0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. Calculate: % undisturbed habitat <u> </u> + [(% moderate and low intensity land uses)/2] <u> </u> = <u>17.5</u> % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10-50% and in 1-3 patches points = 2 Undisturbed habitat 10-50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0		1
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1 km Polygon is high intensity points = 0		-2
Total for H 2	Add the points in the boxes above	-1

Rating of Landscape Potential If score is: 4-6 = H 1-3 = M X < 1 = L Record the rating on the first page

H 3.0. Is the habitat provided by the site valuable to society?		
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? Choose only the highest score that applies to the wetland being rated. Site meets ANY of the following criteria: points = 2 <input checked="" type="checkbox"/> It has 3 or more priority habitats within 100 m (see next page) <input type="checkbox"/> It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) <input type="checkbox"/> It is mapped as a location for an individual WDFW priority species <input type="checkbox"/> It is a Wetland of High Conservation Value as determined by the Department of Natural Resources <input type="checkbox"/> It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1 Site does not meet any of the criteria above points = 0		2

Rating of Value If score is: X 2 = H 1 = M 0 = L Record the rating on the first page

Wetland name or number B

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf> or access the list from here: <http://wdfw.wa.gov/conservation/phs/list/>)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: **NOTE:** *This question is independent of the land use between the wetland unit and the priority habitat.*

- **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ✓ **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- ✓ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ✓ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number B

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt <div style="text-align: right;"> Yes – Go to SC 1.1 <u>No = Not an estuarine wetland</u> </div>	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? <div style="text-align: right;"> Yes = Category I No - Go to SC 1.2 </div>	Cat. I
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are <i>Spartina</i> , see page 25) — At least ⅓ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. <div style="text-align: right;"> Yes = Category I No = Category II </div>	Cat. I Cat. II
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? <div style="text-align: right;"> Yes – Go to SC 2.2 No – Go to SC 2.3 </div> SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? <div style="text-align: right;"> Yes = Category I <u>No = Not a WHCV</u> </div> SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf <div style="text-align: right;"> Yes – Contact WNHP/WDNR and go to SC 2.4 No = Not a WHCV </div> SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? <div style="text-align: right;"> Yes = Category I No = Not a WHCV </div>	Cat. I
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? <i>Use the key below. If you answer YES you will still need to rate the wetland based on its functions.</i> SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? <div style="text-align: right;"> Yes – Go to SC 3.3 No – Go to SC 3.2 </div> SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? <div style="text-align: right;"> Yes – Go to SC 3.3 <u>No = Is not a bog</u> </div> SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? <div style="text-align: right;"> Yes = Is a Category I bog No – Go to SC 3.4 </div> NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? <div style="text-align: right;"> Yes = Is a Category I bog No = Is not a bog </div>	Cat. I

Wetland name or number B

<p>SC 4.0. Forested Wetlands</p> <p>Does the wetland have at least <u>1</u> contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? <i>If you answer YES you will still need to rate the wetland based on its functions.</i></p> <ul style="list-style-type: none"> — Old-growth forests (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — Mature forests (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). <p>Yes = Category I <u>No</u> = Not a forested wetland for this section</p>	<p>Cat. I</p>
<p>SC 5.0. Wetlands in Coastal Lagoons</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <ul style="list-style-type: none"> — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>) <p>Yes – Go to SC 5.1 <u>No</u> = Not a wetland in a coastal lagoon</p> <p>SC 5.1. Does the wetland meet all of the following three conditions?</p> <ul style="list-style-type: none"> — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland is larger than 1/10 ac (4350 ft²) <p>Yes = Category I No = Category II</p>	<p>Cat. I</p> <p>Cat. II</p>
<p>SC 6.0. Interdunal Wetlands</p> <p>Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? <i>If you answer yes you will still need to rate the wetland based on its habitat functions.</i></p> <p>In practical terms that means the following geographic areas:</p> <ul style="list-style-type: none"> — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 <p>Yes – Go to SC 6.1 <u>No</u> = not an interdunal wetland for rating</p> <p>SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = Category I No – Go to SC 6.2</p> <p>SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = Category II No – Go to SC 6.3</p> <p>SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = Category III No = Category IV</p>	<p>Cat I</p> <p>Cat. II</p> <p>Cat. III</p> <p>Cat. IV</p>
<p>Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form</p>	<p><u>NA</u></p>

Wetland name or number B

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Figure B.1. Cowardin Classes

Teal = Wetland B; green = emergent; orange = scrub-shrub



Figure B.2. Hydroperiods

Teal = Wetland B; Solid blue = seasonally flooded or inundated; blue dotted = saturated only; blue lines = seasonally flowing stream

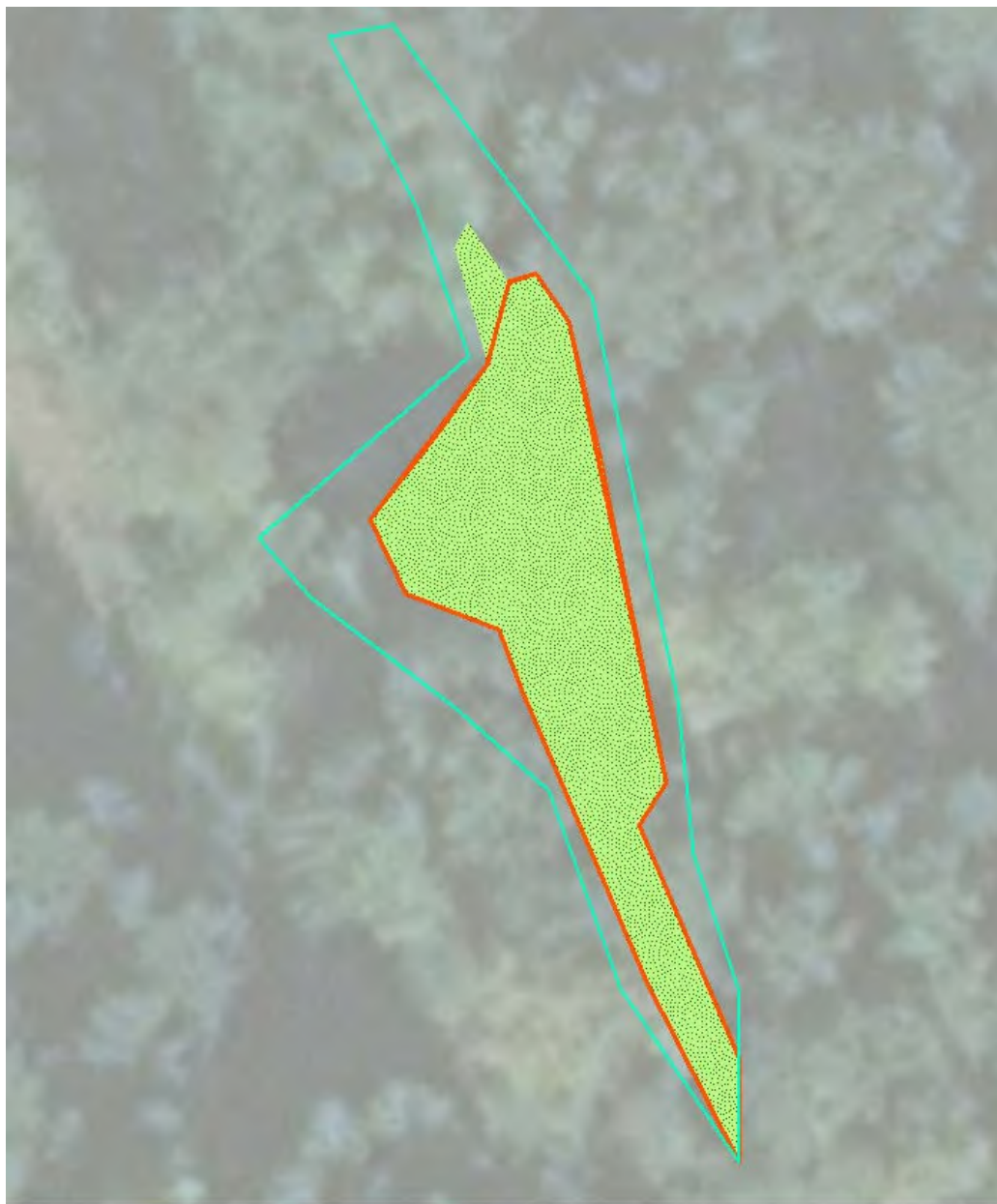


Figure B.3. Cover of dense and dense, rigid plants

Teal = Wetland B; green dotted = cover of dense plants; orange = cover of dense, rigid plants



Figure B.4. 150-foot buffer

Green = Wetland B; yellow = 150-foot buffer



Figure B.5. Land uses within 1 km

Green = Wetland B; pink = 1 km buffer; blue = low-moderate intensity land uses; orange = accessible habitat

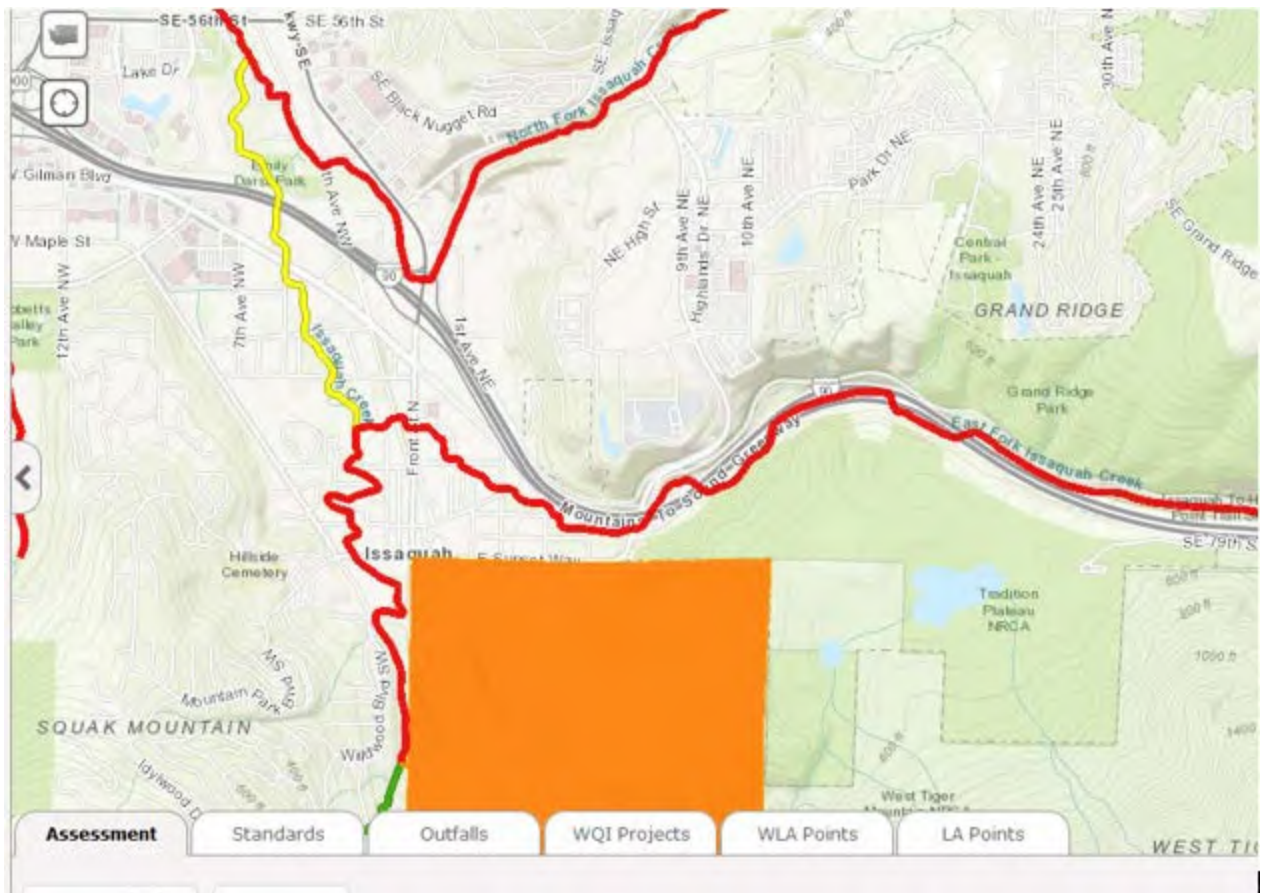


Figure B.6. 303(d) listed waters in basin

Red = 303(d) listed waters


 DEPARTMENT OF ECOLOGY State of Washington		Regulations & Permits	Research & Data	Site Map	Contact Us
<input type="text"/>					
Home	Air & Climate	Water & Shorelines	Waste & Toxics	Spills & Cleanup	
Spokane River	King	Sammamish River and Tributaries	Dissolved Oxygen Temperature	Under Development	Joan Nolan 425-649-4425
Yakima watershed toxics reduction project					

Figure B.7. TMDL for WRIA 8

Wetland name or number C

RATING SUMMARY – Western Washington

Name of wetland (or ID #): C Date of site visit: 050317

Rated by SCOTT OLIVASTED Trained by Ecology? Yes ☒ No ☐ Date of training _____

HGM Class used for rating SLOPE Wetland has multiple HGM classes? ☐ Y ☒ N

NOTE: Form is not complete without the figures requested (figures can be combined).

Source of base aerial photo/map _____

OVERALL WETLAND CATEGORY III (based on functions _____ or special characteristics _____)

1. Category of wetland based on FUNCTIONS

_____ Category I – Total score = 23 - 27

_____ Category II – Total score = 20 - 22

☒ Category III – Total score = 16 - 19

_____ Category IV – Total score = 9 - 15

75'

FUNCTION	Improving Water Quality			Hydrologic			Habitat			
Circle the appropriate ratings										
Site Potential	H	M	L	H	M	L	H	M	L	
Landscape Potential	H	M	L	H	M	L	H	M	L	
Value	H	M	L	H	M	L	H	M	L	
Score Based on Ratings	5			5			6			16

Score for each
function based
on three
ratings
(order of ratings
is not
important)

9 = H,H,H

8 = H,H,M

7 = H,H,L

7 = H,M,M

6 = H,M,L

6 = M,M,M

5 = H,L,L

5 = M,M,L

4 = M,L,L

3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	<u>X</u>

Wetland name or number C

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (<i>can be added to map of hydroperiods</i>)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (<i>can be added to another figure</i>)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	C.1
Hydroperiods	H 1.2	C.2
Plant cover of dense trees, shrubs, and herbaceous plants	S 1.3	C.3
Plant cover of dense, rigid trees, shrubs, and herbaceous plants (<i>can be added to figure above</i>)	S 4.1	C.3
Boundary of 150 ft buffer (<i>can be added to another figure</i>)	S 2.1, S 5.1	C.4
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	C.5
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	C.6
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	C.7

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO - go to 2

YES - the wetland class is **Tidal Fringe** - go to 1.1

- 1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO - Saltwater Tidal Fringe (Estuarine)

YES - Freshwater Tidal Fringe

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO - go to 3

YES - The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

- ___ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
___ At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO - go to 4

YES - The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

- ___ The wetland is on a slope (*slope can be very gradual*),
___ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
___ The water leaves the wetland **without being impounded**.

NO - go to 5

YES - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

- ___ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
___ The overbank flooding occurs at least once every 2 years.

Wetland name or number C

NO - go to 6

YES - The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO - go to 7

YES - The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO - go to 8

YES - The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number C

SLOPE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

S 1.0. Does the site have the potential to improve water quality?		
S 1.1. Characteristics of the average slope of the wetland: (a 1% slope has a 1 ft vertical drop in elevation for every 100 ft of horizontal distance) Slope is 1% or less points = 3 Slope is > 1%-2% points = 2 Slope is > 2%-5% points = 1 Slope is greater than 5% points = 0		2
S 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (use NRCS definitions): Yes = 3 No = 0		0
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. <i>Dense means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 in.</i> Dense, uncut, herbaceous plants > 90% of the wetland area points = 6 Dense, uncut, herbaceous plants > ½ of area points = 3 Dense, woody, plants > ½ of area points = 2 Dense, uncut, herbaceous plants > ¼ of area points = 1 Does not meet any of the criteria above for plants points = 0		1
Total for S 1 Add the points in the boxes above		3

Rating of Site Potential If score is: 12 = H 6-11 = M X0-5 = L

Record the rating on the first page

S 2.0. Does the landscape have the potential to support the water quality function of the site?		
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? Yes = 1 No = 0		0
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources _____ Yes = 1 No = 0		0
Total for S 2 Add the points in the boxes above		0

Rating of Landscape Potential If score is: 1-2 = M X0 = L

Record the rating on the first page

S 3.0. Is the water quality improvement provided by the site valuable to society?		
S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0		1
S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? At least one aquatic resource in the basin is on the 303(d) list. Yes = 1 No = 0		1
S 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? Answer YES if there is a TMDL for the basin in which unit is found. Yes = 2 No = 0		0
Total for S 3 Add the points in the boxes above		2

Rating of Value If score is: X2-4 = H 1 = M 0 = L

Record the rating on the first page

Wetland name or number C

SLOPE WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream erosion

S 4.0. Does the site have the potential to reduce flooding and stream erosion?

S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually > 1/8 in), or dense enough, to remain erect during surface flows.*

Dense, uncut, **rigid** plants cover > 90% of the area of the wetland

points = 1

All other conditions

points = 0

0

Rating of Site Potential If score is: 1 = M ~~0~~ = L

Record the rating on the first page

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?

S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff?

Yes = 1 No = 0

0

Rating of Landscape Potential If score is: 1 = M ~~0~~ = L

Record the rating on the first page

S 6.0. Are the hydrologic functions provided by the site valuable to society?

S 6.1. Distance to the nearest areas downstream that have flooding problems:

The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds)

points = 2

Surface flooding problems are in a sub-basin farther down-gradient

points = 1

No flooding problems anywhere downstream

points = 0

2

S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?

Yes = 2 No = 0

0

Total for S 6

Add the points in the boxes above

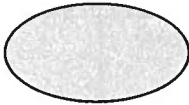
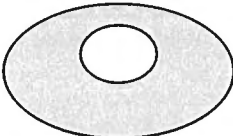

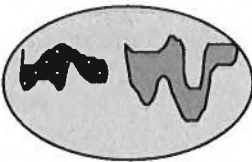

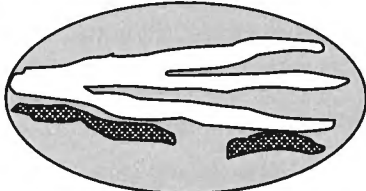
2

Rating of Value If score is: ~~2~~-4 = H 1 = M 0 = L

Record the rating on the first page

NOTES and FIELD OBSERVATIONS:

Wetland name or number C

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that site functions to provide important habitat	
H 1.0. Does the site have the potential to provide habitat?	
<p>H 1.1. Structure of plant community: <i>Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.</i></p> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <p><input type="checkbox"/> Aquatic bed</p> <p><input checked="" type="checkbox"/> Emergent</p> <p><input type="checkbox"/> Scrub-shrub (areas where shrubs have > 30% cover)</p> <p><input checked="" type="checkbox"/> Forested (areas where trees have > 30% cover)</p> <p><i>If the unit has a Forested class, check if:</i></p> <p><input type="checkbox"/> The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon</p> </div> <div style="width: 35%;"> <p>4 structures or more: points = 4</p> <p>3 structures: points = 2</p> <p>2 structures: points = 1</p> <p>1 structure: points = 0</p> </div> </div>	1
<p>H 1.2. Hydroperiods</p> <p>Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (<i>see text for descriptions of hydroperiods</i>).</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <p><input type="checkbox"/> Permanently flooded or inundated</p> <p><input checked="" type="checkbox"/> Seasonally flooded or inundated</p> <p><input type="checkbox"/> Occasionally flooded or inundated</p> <p><input checked="" type="checkbox"/> Saturated only</p> <p><input type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland</p> <p><input checked="" type="checkbox"/> Seasonally flowing stream in, or adjacent to, the wetland</p> <p><input type="checkbox"/> Lake Fringe wetland</p> <p><input type="checkbox"/> Freshwater tidal wetland</p> </div> <div style="width: 35%;"> <p>4 or more types present: points = 3</p> <p>3 types present: points = 2</p> <p>2 types present: points = 1</p> <p>1 type present: points = 0</p> </div> </div>	2
<p>H 1.3. Richness of plant species</p> <p>Count the number of plant species in the wetland that cover at least 10 ft². <i>Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle</i></p> <p>If you counted: > 19 species points = 2</p> <p>5 - 19 species points = 1</p> <p>< 5 species points = 0</p>	1
<p>H 1.4. Interspersion of habitats</p> <p>Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. <i>If you have four or more plant classes or three classes and open water, the rating is always high.</i></p> <div style="display: flex; justify-content: space-around; align-items: flex-end; margin-top: 20px;"> <div style="text-align: center;">  <p>None = 0 points</p> </div> <div style="text-align: center;">  <p>Low = 1 point</p> </div> <div style="text-align: center;">  <p>Moderate = 2 points</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-end; margin-top: 20px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <p style="margin-top: 10px;">All three diagrams in this row are HIGH = 3points</p>	1

Wetland name or number C

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. <i>The number of checks is the number of points.</i> <input checked="" type="checkbox"/> Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). <input checked="" type="checkbox"/> Standing snags (dbh > 4 in) within the wetland <input type="checkbox"/> Undercut banks are present for at least 6.6 ft (2 m) and/or overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) <input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet weathered where wood is exposed</i>) <input type="checkbox"/> At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>) <input checked="" type="checkbox"/> Invasive plants cover less than 25% of the wetland area in every stratum of plants (<i>see H 1.1 for list of strata</i>)		3
Total for H 1	Add the points in the boxes above	8

Rating of Site Potential If score is: 15-18 = H ☒ 7-14 = M 0-6 = L Record the rating on the first page

H 2.0. Does the landscape have the potential to support the habitat functions of the site?		
H 2.1. Accessible habitat (include <i>only habitat that directly abuts wetland unit</i>). Calculate: % undisturbed habitat <u>15</u> + [(% moderate and low intensity land uses)/2] <u>15</u> = <u>7.5</u> % If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon (trails) points = 3 20-33% of 1 km Polygon points = 2 10-19% of 1 km Polygon points = 1 < 10% of 1 km Polygon points = 0		0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. Calculate: % undisturbed habitat <u>35</u> + [(% moderate and low intensity land uses)/2] <u>35</u> = <u>17.5</u> % Undisturbed habitat > 50% of Polygon (trails) points = 3 Undisturbed habitat 10-50% and in 1-3 patches points = 2 Undisturbed habitat 10-50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0		1
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (-2) ≤ 50% of 1 km Polygon is high intensity points = 0		-2
Total for H 2	Add the points in the boxes above	-1

Rating of Landscape Potential If score is: 4-6 = H 1-3 = M ☒ < 1 = L Record the rating on the first page

H 3.0. Is the habitat provided by the site valuable to society?		
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? Choose <i>only the highest score that applies to the wetland being rated</i>. Site meets ANY of the following criteria: points = 2 <input checked="" type="checkbox"/> It has 3 or more priority habitats within 100 m (see next page) <input type="checkbox"/> It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) <input type="checkbox"/> It is mapped as a location for an individual WDFW priority species <input type="checkbox"/> It is a Wetland of High Conservation Value as determined by the Department of Natural Resources <input type="checkbox"/> It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1 Site does not meet any of the criteria above points = 0		2

Rating of Value If score is: ☒ 2 = H 1 = M 0 = L Record the rating on the first page

Wetland name or number C

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf> or access the list from here: <http://wdfw.wa.gov/conservation/phs/list/>)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: **NOTE:** *This question is independent of the land use between the wetland unit and the priority habitat.*

- **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ✗ **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- ✗ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ✗ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number C

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt <div style="text-align: right;"> Yes – Go to SC 1.1 No = Not an estuarine wetland </div>	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? <div style="text-align: right;"> Yes = Category I No - Go to SC 1.2 </div>	Cat. I
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are <i>Spartina</i> , see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. <div style="text-align: right;"> Yes = Category I No = Category II </div>	Cat. I Cat. II
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? <div style="text-align: right;"> Yes – Go to SC 2.2 No – Go to SC 2.3 </div> SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? <div style="text-align: right;"> Yes = Category I No = Not a WHCV </div> SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf <div style="text-align: right;"> Yes – Contact WNHP/WDNR and go to SC 2.4 No = Not a WHCV </div> SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? <div style="text-align: right;"> Yes = Category I No = Not a WHCV </div>	Cat. I
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? <i>Use the key below. If you answer YES you will still need to rate the wetland based on its functions.</i> SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? <div style="text-align: right;"> Yes – Go to SC 3.3 No – Go to SC 3.2 </div> SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? <div style="text-align: right;"> Yes – Go to SC 3.3 No = Is not a bog </div> SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? <div style="text-align: right;"> Yes = Is a Category I bog No – Go to SC 3.4 </div> NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? <div style="text-align: right;"> Yes = Is a Category I bog No = Is not a bog </div>	Cat. I

Wetland name or number C

<p>SC 4.0. Forested Wetlands</p> <p>Does the wetland have at least <u>1 contiguous acre</u> of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? <i>If you answer YES you will still need to rate the wetland based on its functions.</i></p> <ul style="list-style-type: none"> — Old-growth forests (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — Mature forests (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). <p>Yes = Category I No = Not a forested wetland for this section</p>	<p>Cat. I</p>
<p>SC 5.0. Wetlands in Coastal Lagoons</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <ul style="list-style-type: none"> — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>) <p>Yes – Go to SC 5.1 No = Not a wetland in a coastal lagoon</p> <p>SC 5.1. Does the wetland meet all of the following three conditions?</p> <ul style="list-style-type: none"> — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. — The wetland is larger than 1/10 ac (4350 ft²) <p>Yes = Category I No = Category II</p>	<p>Cat. I</p> <p>Cat. II</p>
<p>SC 6.0. Interdunal Wetlands</p> <p>Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? <i>If you answer yes you will still need to rate the wetland based on its habitat functions.</i></p> <p>In practical terms that means the following geographic areas:</p> <ul style="list-style-type: none"> — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 <p>Yes – Go to SC 6.1 No = not an interdunal wetland for rating</p> <p>SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?</p> <p>Yes = Category I No – Go to SC 6.2</p> <p>SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?</p> <p>Yes = Category II No – Go to SC 6.3</p> <p>SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?</p> <p>Yes = Category III No = Category IV</p>	<p>Cat I</p> <p>Cat. II</p> <p>Cat. III</p> <p>Cat. IV</p>
<p>Category of wetland based on Special Characteristics</p> <p>If you answered No for all types, enter "Not Applicable" on Summary Form</p>	<p>NA</p>

Wetland name or number C

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Figure C.1. Cowardin Classes

Teal = Wetland C; green = emergent; brown = forested

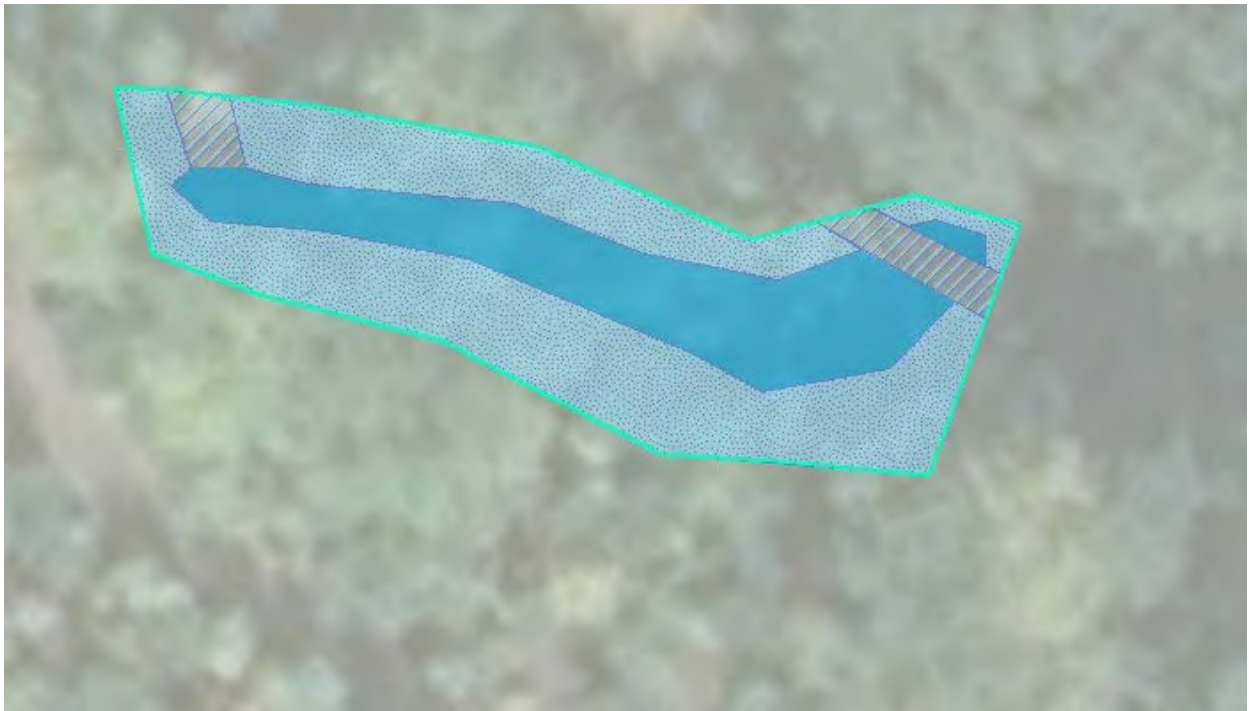


Figure C.2. Hydroperiods

Teal = Wetland C; Solid blue = seasonally flooded or inundated; blue dotted = saturated only; blue lines = seasonally flowing stream

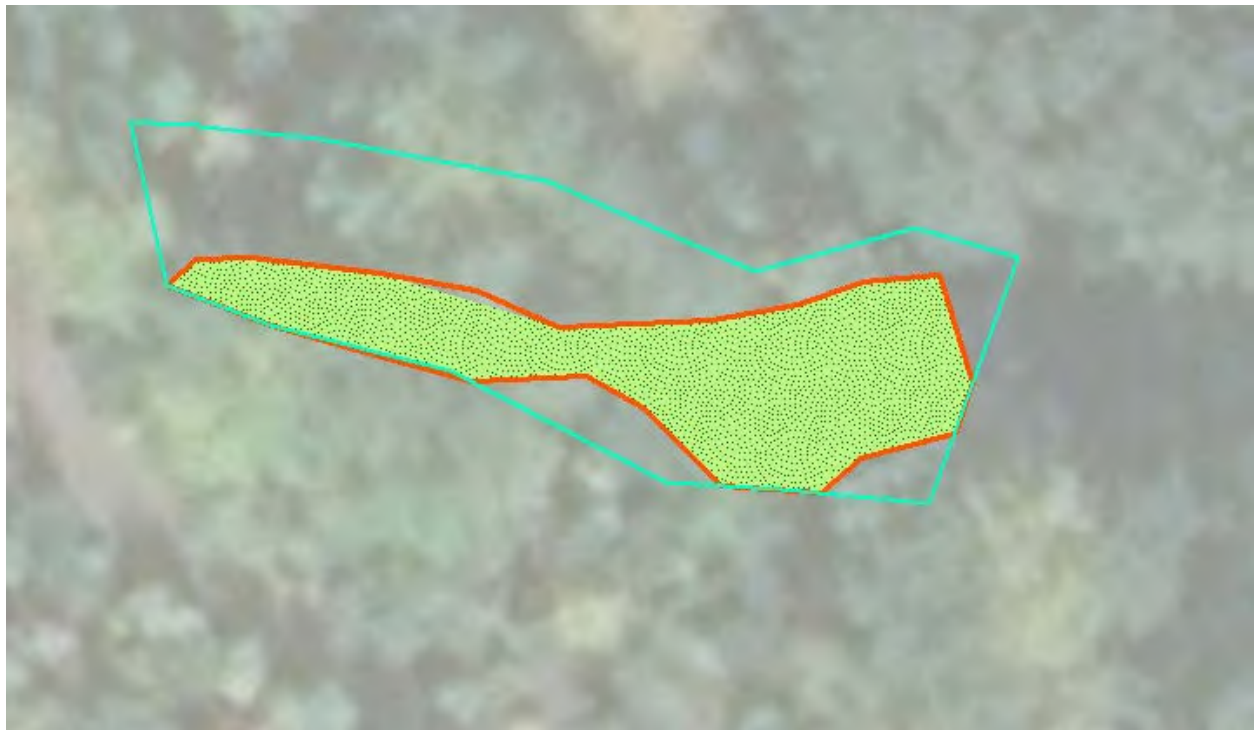


Figure C.3. Cover of dense and dense, rigid plants

Teal = Wetland C; green dotted = cover of dense plants; orange = cover of dense, rigid plants



Figure C.4. 150-foot buffer

Green = Wetland C; yellow = 150-foot buffer

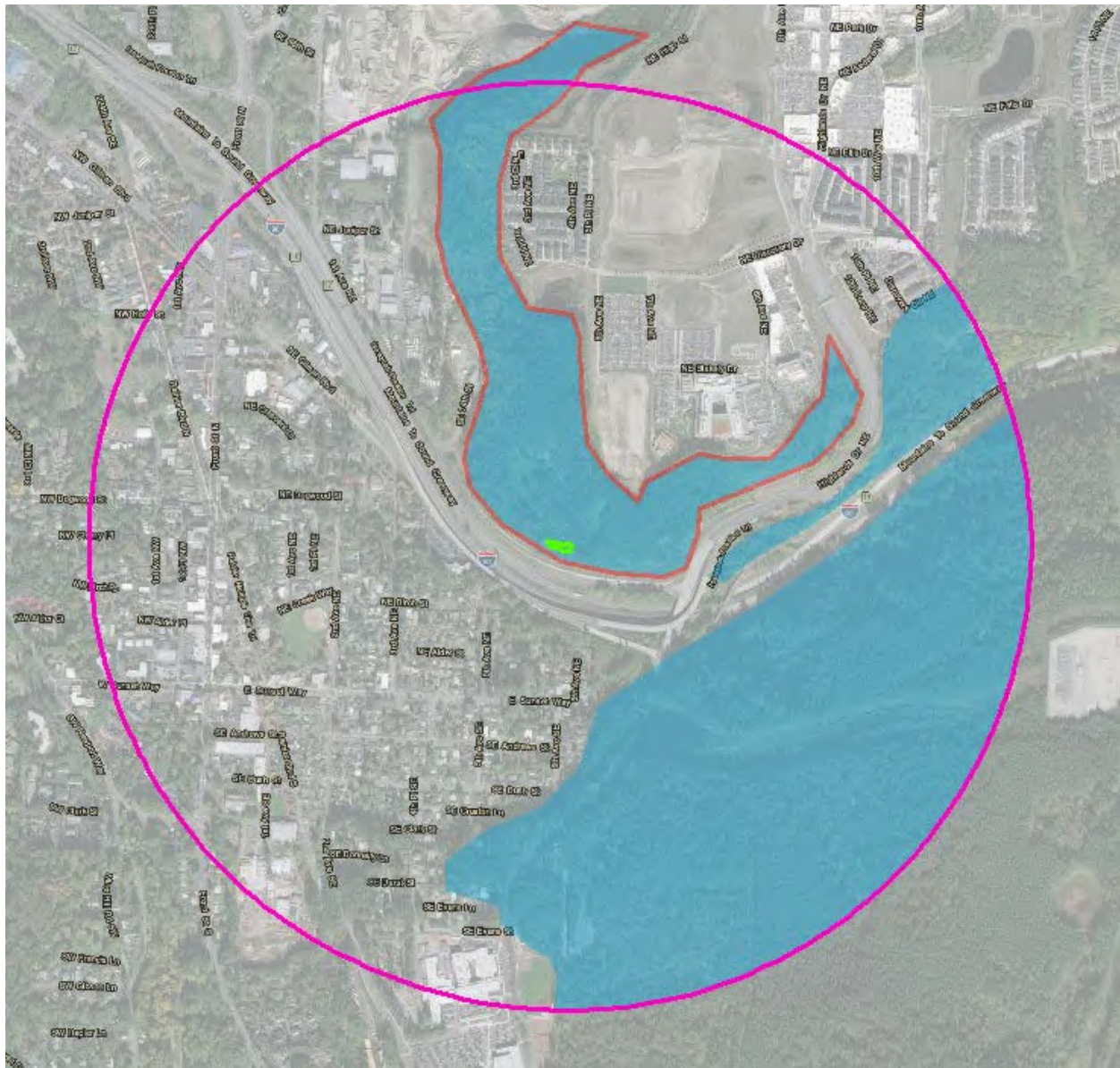


Figure C.5. Land uses within 1 km

Green = Wetland C; pink = 1 km buffer; blue = low-moderate intensity land uses; orange = accessible habitat



Figure C.6. 303(d) listed waters in basin

Red = 303(d) listed waters


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Figure C.7. TMDL for WRIA 8